MANKIND

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ORIGINAL ARTICLES :

Melanesia : Social Organization. **Meggitt.**

Enga Political Organization. A Preliminary Description.[1]

By Mervyn Meggitt, M.A., Department of Anthropology, University of Sydney.

Enga forms the largest collection of peoples west of the Hagen Range known to share a common language and culture. They number at least 60,000, and occupy the valleys of the Lai, Sau, Minjamp, Tale, and Ambum Rivers, as well as the headwaters of the Lagaip River, all of which are in the Wabag Subdistrict of the Western Highlands District of the Territory of New Guinea. Their territories range from about 4,500 to 8,000 feet above sea level, and their subsistence pattern is typically highland. They garden intensively, and sweet potato is the staple crop. Pigs are raised, mainly for disposal in prestige-building exchanges and distributions. Hunting and gathering play a very small part in Enga economy. There are no villages. Named patri-clans occupy well-defined and continuous territories within which members live in scattered homesteads. Population density ranges from about 100 to 200 people per square mile, and varies more or less inversely with altitude above sea level of the gardens. The area appears to be populated to the limits of the present Enga system of horticulture.

Enga regard themselves as a single linguistic and cultural group, different from neighbouring peoples such as the Simbai of the Mount Hagen area, the Ipili of the Porgera valley and the Pai-ela of the Porgubieri valley. Dress, decoration and wig styles are taken as the conventional criteria of differentiation. But they have no general name for themselves. Enga is a name given them by people east of the Hagen Range. There are, however, seven or eight named, local divisions of Enga, distinguished by members and non-members in terms of minor differences in dialect and custom. There are, e.g., the Laiap people of the lower Lai valley who number 15,000 to 20,000 members, the Sjak of the Tale valley who number about 5,000, the Mae of the upper Lai, Ambum and Lagaip valleys who number about 20,000, and the Jandapu of the Lagaip headwaters who number about 5,000. None of these aggregates can be regarded as a tribe ; the aggregates never act as groups under any circumstances, and they have no unified political organization or central authority. They are simply cultural sub-areas.

The basic land-holding and war-making group is the exogamous patriclan, which is normally an autonomous political unit. Clan territories average about three square miles in area, but vary from about one to six or seven square miles. The average number of

[1] The data on which this paper is based were collected during fieldwork near Wabag in 1955–56 when the writer held the W. M. Strong Research Fellowship, administered by the University of Sydney.

people living in a clan territory is about 280, but the groups range from about 80 to 1,000 members. Inheritance of usufructory rights to land and of trees is ideally individually partilineal; but land, whether arable or forest, can not be voluntarily alienated from the patriclans. Individual affines and matrikin may be granted gardening rights in clan land, on the understanding either that their tenure is temporary, e.g., for one or two garden seasons, or that they become permanent and full members of the clan. In the latter case, in theory, the immigrant should relinquish any claims to his patrimonial land and trees; in fact, such men usually try to maintain gardens in both parishes. This leads to bitter disputes and occasional forcible evictions. The ratio of such immigrant members of clans varies from about five to 35% of the clan parish population. Clans which have lost many members because of fights, illnesses, or garden failures are those most likely to welcome permanent immigrants. It is recognized that the depopulated clan cannot hold out for long against more powerful neighbours.

Clans comprise from two to six or seven subclans. While there is a tendency for gardens and houses of subclan members to lie together inside the clan territory, this is by no means strongly marked. Whether subclans are better regarded as patrilineages is a problem I have not yet solved; but I am currently inclined to think that they do conform to the appropriate criteria of lineage definition. At any rate, these are the groups primarily involved in most compensatory distributions of pigs and goods. Subclans are further subdivided into groups counting descent from common grandfathers or, occasionally, from common great-grandfathers. These groups are normally co-residential and are mainly concerned in assisting in house building and in the marriage exchanges of wealth, although subclans are often similarly involved.

Enga ritual activity is very limited; but every 18 to 20 months, the bachelors of each clan go into a short seclusion during which they magically rid themselves of the pernicious effects of association with women. A clan's decision to go into seclusion is taken by the senior bachelors independently of the decisions of other clans to do so. Seclusion residence and ritual grouping more or less follow the lines of subclan affiliation; but the affair is seen by participants and outsiders mainly as a clan matter. To a minor degree, then, this reinforces clan solidarity.

Groups of from three to nine or ten contiguous clans are linked as "brother" clans into phratries whose average membership is about 2,000 people. This bond of putative descent from a common ancestor, while explicit, is rather tenuous. Phratries are neither consistently endogamous nor exogamous. Infrequently-held fertility ceremonies to placate ancestral ghosts generally operate on a phratry-wide basis; but clans may or may not participate as they choose. Such assemblies tend, to a liminted extent, to point up common phratry descent or affiliation; but there are no individuals or groups wielding phratry-wide authority on these occasions. The specialists, or spellmen, who perform the main ritual of greasing the clan's ancestral stones and invoking the ancestors, are not necessarily members of the phratry involved. In any case, they have no special political, jural, or economic status.

In short, magico-religious ritual contributes little to clan or phratry cohesion. The bachelor's seclusion and the fertility ceremony are the only clan-wide assemblies for ritual purposes. Other rituals such as divining and placation of individual ghosts, involve only family groups.

In the past, once or twice each generation, large-scale sporting fights occurred in which two or three phratries would fight more or less as units. The usual pattern was that one clan, irked by the behaviour of another, insulted and challenged its members to demonstrate their skill and courage in battle. Each clan called on its phratry for aid; and the teams assembled on conveniently situated grassy downs to fight. In the last of these fights which occurred in the Sari area some years ago, three phratries fought a triangular battle for about a week. About 2,500 men were involved; but actions were mainly among individual clans. Combatants broke off each evening for food and rest; and night attacks were deplored. The group skirmishes were punctuated by formalized and generally bloodless duels between important men of opposing teams. These were concluded by the duelists' exchanging their shell and feather decorations. The main battle was concluded by agreement among the big men of each clan when casualities on each team had reached ten or so; and a large scale exchange of pork and valuables followed. Then all went home. It was bad form to use such fights as a pretext for burning houses, seizing pigs or land, or killing women or children. Apparently, the big men and elders often had to expend much breath and energy to restrain from such breaches of courtesy younger men who had been carried away with an excess of zeal.

The more common sort of fight was that wherein one clan, using the theft of a pig or of pandanus nuts as an excuse, attacked without warning a neighbouring clan in an attempt to seize land. Then, any technique which ensured victory was adopted. Night attacks and ambushes were most favoured. Enemy houses were fired with their occupants inside; women and children were cut down; pigs were seized; pandanus palms were felled; and gardens were torn up. In short, everything possible was done to disorganize the enemy clan so that it was forced to flee piecemeal to kinsmen for shelter.

If, as often happened, individual members of either clan had relatives, especially matrikinsmen, in the opposing force, they took good care not to come into actual conflict with these, for this could destroy a valuable exchange relationship. Indeed, if a clan contemplated an attack, the men were usually careful to keep their deliberations from other clansmen who had relatives and/or trade partners among the proposed victims. Normally, it was believed, these men would place present advantage above such ties; but one could never be sure. Sometimes a subelan would stand aside entirely from a fight if it had many ties of relationship or obligation with the clan being attacked by its brother subclans. The certain advantages of current exchange relations were preferred to the doubtful possibility of gaining more land and pigs by violence. But if its own clan was losing, the subclan joined the fight.

If possible, the losers in the initial attack regrouped and counter-attacked; and the dispute would settle down to sporadic raiding over a period of weeks or months. When casualties on both sides became uncomfortably numerous, e.g. when 10 to 15 men had been killed, the older men tried, usually successfully, to dissuade first the big men and then the young men from further killing. Their arguments stressed the losses among the clan, and also the losses among actual or potential exchange partners in the other clan. Old men of both sides then negotiated a truce, in which clan boundaries were confirmed as at that time. The clans, then, over a period of months, compensated each other for the deaths incurred in that fight. Very rarely, the losers would add many pigs to their normal payments in an

attempt to ransom their lost land. Normally, however, the winners would not relinquish the land because they needed it themselves. So the losers had to wait until their numbers had built up and they had enlisted the aid of enough matrikin and affines ; then they attacked again.

Occasionally, in these fights, co-phratry clans aided their brothers, but rarely would the fight involve phratries as units. Often phratry brothers would fight as individuals on both sides to help exchange partners and relatives. Similar fights also occurred within phratries almost as often as outside them. Furthermore, the big men of a clan seeking more land would strike a bargain with big men of a clan on the other side of an intended victim, without any regard for phratry affiliations. In return for a diversionary attack from the rear, the latter clans would be promised timber or pandanus right in any land captured, while the instigators reserved garden and residential rights. Usually the parties to such agreements, if successful, fell out over the division of spoils, and fought each other.

A very few defeats were so crushing and the vanquished clan lost so much land and so many men, that it had no hope of returning to its territory to re-open the fight. Then fragments of the clan would settle permanently with matrikinsmen or affines ; and, within a generation, they would become absorbed into the hosts' clans as subclans, still bearing their old clan name. Within another generation or two, this subclan's name would be counted as that of an actual son of the clan founder. Similarly, sections, sometimes whole subclans of clans badly hit by frosts and garden failures also migrated to relatives' clans and were thus absorbed.

Fights between subclans of the one clan occurred fairly often. They usually arose out of theft of pigs, or usurpation of garden land. Although there was no ritual sanctions against spilling blood within the clan, these fights were usually more noisy than bloody. But if deaths did occur, the subclans compensated each other in the same manner as did clans.

In between fights, clans maintained frequent exchange relationships. These were, and are of four main sorts : 1. marriage contracts in which bride price and return gifts are exchanged ; 2. compensations of individual matrikins and affines for the illnesses and deaths of clansmen ; 3. compensations of the clansmen of various fight and murder victims ; 4. moka exchanges. Moka exchanges are the most important, and the arrangement of the other sorts of exchanges is always carried out with an eye to the ultimate benefit of the donors in the moka.

Most of the organizing of these exchanges, especially of 3 and 4, is undertaken by big, i.e., energetic, intelligent and wealthy men, of which there are usually two or three in a subclan. The same men maintain a limited amount of power within the clan because they can call on the support of their debtors and of those anxious to establish an exchange relationship with them. This sort of authority, however, endures only as long as the big man remains solvent and can muster sufficient force to make his demands stick. Big men thus have few, or no consistent and generally accepted ritual, jural, or political rights and authority within their own clans, and certainly none outside them. Conversely, they have few obligations, other than those arising from maintenance of personal, economic prestige. As private agents, they aim primarily at personal aggrandizement ; contribution to the welfare and prestige of the subclan or clan as such is a secondary consideration.

The big man's position is not hereditary. The Enga pattern of mortuary distributions dissipates his moveable wealth at his death ; and the amount of garden land and the number of trees which even a big man can acquire are limited by the general shortage of land. The inheriting son of a big man therefore gets off to a start in life which is only a little better than that of his clansmen. He inherits certain credits, but must work hard to improve his position.

By and large, then, relations between clans and even subclans were conditioned largely by the recognition of selfish interests, and were ultimately sanctioned by the use, or threat of force. There was no judicial procedures whereby clans could litigate or arbitrate on inter-clan disputes. Within clans, there were similarly no courts ; but there was more chance of reconciliations being effected without serious violence. Disputants knew they would need clansmen's help in certain economic transactions affecting their own prestige, so would not press them too far lest they alienated them completely. The general Enga attitude in daily living appears to be " Get away with as much as you dare, but do not cut yourself off from people who can help you." Men demand the benefits of subclan or clan aid in various situations, while reserving the right to do much as they please themselves. The drive towards maximising individual's prestige through exchange relationships, especially in the moka, seems to be the main factor maintaining inter-group relations, for this goal cannot be achieved alone.

Almost all Enga men with whom I have discussed the matter welcome the advent of the Administration's peace, because it extends their exchange opportunities. A few comment nostalgically on the good old days when they could kill people who injured their interests. Meanwhile, all have taken enthusiastically to the opportunities for litigation offered them both by the informal luluais', paramounts' and police sergeant's courts, as well as by the formal Courts for Native Affairs held by Administrations officers. Men normally try to use court actions as a substitute technique for advancing their personal interests by attacking rivals. The general trend, however, is for the Administration to view these actions as litigation between groups of varying size, whose spokesmen are luluais, tultuls and bossboys. The authority of these native officials is thus being built up fairly rapidly, mainly at the expense of those who were previously the big men of subclans and clans.

M. J. MEGGITT.

Melanesia : Social Anthropology. **Bell.**

Male and Female in Tanga : Being a Description of Certain Sexual Aspects of the Ritual Life.[1]

By F. L. S. Bell, M.A.

The title of my address this evening is *Male and Female in Tanga : Being a Description of Certain Sexual Aspects of the Ritual Life.* The subtitle is a more accurate label for what you are about to hear than the title. I intend to confine my remarks to a description of certain traditional modes of behaviour which characterize the life of the Tangan and which are, at the same time, closely connected with his sexual life. These ritual beliefs and practices play a vital part in the individual and social life of the native. By his celebration of these

[1] Presidential Address delivered at the Annual Meeting of the Anthropological Society of N.S.W., held in the Department of Anthropology, University of Sydney, on Tuesday, 14th February, 1956.

rites he reinforces the bonds which link him with the world of the supernatural. They are not just mere observances. They give meaning to his life. In other words, for him, they make life worth living.

Dafal.

From birth to death, every important change in his status as an individual is accompanied by the celebration of an appropriate rite and among those which he meets very early in his life is the important cycle of rites known as *dafal*. Peculiar to say, my attention was first directed to this cycle by reason of the many references to it in the mythology of the people. The term *dafal* is used to describe the initiate taking part in the rite as well as the rite itself and there are very few myths indeed in which *Dafal* does not take a principal part. She is the heroine *par excellence* of Tangan mythology. She represents the acme of female beauty and intelligence. She is the ideal sexual partner. She is the Tangan Helen. And how does the modern Tangan maiden attain such a reputation ? Firstly, only the daughters of sisters of wealthy chieftains are eligible to take part in the rites. However, since infant betrothal is practised in Tanga, a girl often participates in the ceremony in partnership with her betrothed ; he generally being the son of her father's sister.

The principal feature of the rite is the confinement of the young adolescent initiates inside specially built wicker cages for a period of twelve months during which time they are subject to special treatment and at the expiration of which they are ceremonially released from their confinement and become guests of honour at a number of large feasts. Unfortunately, the rite was not celebrated whilst I was living among these people.[2] However, I met and spoke to several who had recently participated in it and there is no doubt in my mind that one of its primary purposes is to make the initiate sexually more attractive. In the case of female initiates—and the majority of *dafal* initiates are female—the whole of the body is rubbed every day with scented oils. The breasts are given special attention and are then covered by two wreaths of sweet smelling leaves, worn bandolier fashion. It is believed that the perfume exuded from the leaves and from the scented oils assists in the psychic and physical development of the initiate. Especially rich foods are provided for her and every effort is made to conserve her energies. She only emerges from her cage and from the specially built house in which the cage is kept, for a short period after dark every evening. Except for her parents, an initiate is never seen by anyone else from the time she enters the cage until she emerges a year later.

From time to time she is visited by parties of male and female friends and relatives who serenade her for several hours at a time with a cycle of songs in which constant mention is made of the doings of the daring men and beautiful women belonging to her clan. During such song *fests*, there is a strict dichotomy of the sexes, the women sitting inside the house in which the cage is erected and the men sitting outside. This separation, for ceremonial purposes, of both men and women is typical of the culture. However, sometimes such affairs end in a licentious riot. The men rush in upon the women singers and douse them with sooty water. The women rush out and playfully attack the men and thus provide a number of not unwilling males with an opportunity for satisfying their sexual desires under a cloak

[2] The author spent the greater part of 1933 carrying out field research among the Tanga, a Melanesian people living off the east coast of New Ireland. The research was undertaken with the aid of a Rockefeller Foundation Grant under the auspices of the Australian National Research Council.

of ceremonial licence. Towards the end of *Dafal's* sojourn within her cage, these outbursts of ceremonial licence tend to increase and I was informed that, on occasions, they caused damage to the structure in which the *dafal* cage was kept.

A principal feature of the rites surrounding the return of the *dafal* initiate is the public presentation of the girl to her clansfolk by her sponsoring mother's brother. She is adorned with feather head-dresses and valuable shell necklaces and ear ornaments and her whole body is rubbed with coconut oil and red ochre. Her breasts are completely concealed by two fine-textured grass wreaths. She sits on a high platform and at her feet is a large basket into which distinguished guests place valuable shell armlets as they parade past her. The highlight of the ceremony is reached when her mother's brother approaches her and removes the two grass breast coverings and dabs her forehead with lime. It is the moment of her return to her community. Once again, she can eat and speak in public but this time, not as an ordinary little girl about the village but as a beautiful nubile woman.

The emphasis throughout the whole cycle of *dafal* rites is sexual, firstly in respect of the physical development of the initiate, secondly in regard to the sexual licence permitted visitors to *Dafal* and thirdly in her public unveiling as a nubile female at the final rite of aggregation.

Standards of Beauty.

So far as the ordinary young man and woman is concerned, their first contact with sex in a ritualized form comes with their first attempts at courtship. As with us, there is a traditional way to woo, based no doubt on the legendary success of ancestors and living, elder members of the community who used such approved methods of approach. Again, as with us, physical beauty *does* count.

Baldness and obesity are rare in Tanga. The odd " fat boy " runs the risk of being referred to as " He who has a belly like a bladder fish " and the occasional bald man is always most careful to cover his nakedness with a wig. A clean, dark brown skin is preferred, and the various types of tropical ringworm are a definite handicap in making love. Large protruding eyes are also regarded as ugly and called " the eyes of the dead " or else compared disdainfully with the full moon. Big protruding lips are not liked though thin lips are also despised, as is a wide-winged flat nose.

Before the advent of the white man, the women preferred perfectly black teeth in men, but the younger generation now use coral sand as a dentifrice, and white teeth are a beauty asset. Protruding or small teeth are disliked, being compared with those of the flying fox. Honey coloured hair, combed out and teased up to a fluffy mass on the top of the head is the ideal male coiffure. Women generally wear their hair cut short. A serious beauty defect is to have ears which stick out. Such an unfortunate is openly scorned and mockingly asked from whom he is running away. The facial shape regarded by these people as a desirable standard is long rather than broad. For example, a legendary character of admitted ugliness named Nia has a broad, flat face with protruding eyes and teeth, a short thickset neck and small lower limbs. A tall man has an advantage over others and is described as " a tall straight stalk in the middle of a clump of bamboos."

It is thus clear that these natives have definite standards of physical beauty. Further, if one were to take any notice of the insulting remarks which are hurled at those who do not

approach these standards, it might appear that physical beauty was an all-important factor in the technique of love-making. However, such is not the case, as was carefully pointed out to me. Even the ugliest of men and women are able to find, in many cases, quite handsome mates. The secret lies in the powerful magical spells which these people are able to call to their aid. These we will discuss later.

Courtship.

In the meantime, let us see how two young people who are attracted to each other act during the period of their courtship. Firstly, they do not meet as strangers, seeing that they have visited each other and played together since childhood and are related to each other through their parents. And yet they do not openly declare their feelings for each other. An intermediary in the person of the girl's mother's mother is induced, by appropriate payments, to aid the young man in his suit. This aid takes two forms: she uses love magic and also informs the girl that a certain young man is favourably disposed towards her. The girl now begins to think constantly of the youth, and, on hearing that he is performing in a dance in the neighbourhood, she secures an invitation to the ceremony and watches her lover, covertly, from amidst the other female guests. The youth in question, on noticing that she is present, immediately concludes that the powerful love spells with which he has been bombarding her ever since the beginning of his suit are now beginning to take effect. His eyes are fixed upon her, and if, during the dance, he can spray her with a fine sprinkle of betel spittle, so much the better. As she watches him prancing along with his comrades she is quick to see him make the unmistakably erotic gesture—a rapid protrusion of the tongue from between the closed lips. However, it would be unthinkable of her to give any outward sign that she is moved by his behaviour. As the dance proceeds, several women approach the men and remove from their heads the decorative feathers or flowers which are fastened thereon. The young girl approaches her grandmother and asks her to get her the feather spray from the head of the youth. The old woman obliges, and the youth knows immediately that the girl is willing to go on with the affair. After the dance, he waits about for her and, with the connivance of the old woman, proceeds to convince her that it would be to their mutual advantage to see more of each other.

An alternative method of showing a man that his attentions are not unwelcome is to approach him whilst he is dancing and touch him on the head with a blazing torch. A man so "cooked", as the natives say, is thus informed that his lady love is willing and waiting.

Lovers generally meet during the day in deserted parts of the bush. Night meetings are not popular for fear of wandering ghosts. Being forced then to meet during the day, Tangan lovers have a series of prearranged signals which they make either on the panpipes or on the flute. Learning these love signals is an important part of the education of all young men, and success in love is often judged by one's ability as a musician. Old men earn quite a competence by teaching these love lyrics to the young. During instruction the young men live in the village of their mentor and are put on a special diet.

Middle-aged informants described the symptoms of a young girl in love as follows: she has a listless, dreamy look in her eyes and is not interested in the everyday life of the village. They laughingly told me how thin were the excuses she made in order to meet her lover. However, they played the game as it is played in Tanga, and even though they knew

that a bad backache which prevented her accompanying the other women to the gardens was not half so bad as she made out, they were quite willing to leave her alone in the house, knowing full well that she would be joined by her lover in a very short time.

Although secrecy seems to cloak the actions of lovers, yet it is often possible to say that an attachment exists between A and B because A wears one of Bs' shell armlets and B dips her betel nut in a lime container belonging to A. That is to say, it is customary for two lovers to exchange gifts and in these days, when European loin cloths are worn by both sexes, to exchange loin cloths.

Beauty Magic.

It is almost an anthropological axiom where we find people using supernatural means to accomplish natural ends, there are certain barriers in the way of such an accomplishment, which appear insuperable to the people concerned. This is the position with regard to the attainment of personal beauty and the pursuit of a desired mate. To the native neither love nor beauty can be successfully achieved by natural means. Many a Tangan lover is nervous, distrait, self-conscious and lacking in moral strength when faced with the task of capturing the affections of a woman but—provide him with a love spell or two and he will pursue her with all the fervour and confidence of a Hollywood male lead.

Let us first enquire into the magic of beauty. Most love spells include some reference to the beauty of the spell-maker but there are other spells which are purely intended to increase magically the personal beauty of their owners.

As an example, let us watch in strictest secrecy a beardless youth performing the magic to increase the length and strength of his facial hair. At the break of dawn the youth goes into the bush, obtains some soft young leaves from a *popauetnul* tree and half murmurs, half sings the following words into the leaves as he rubs them between the palms of his hands :

> O ! What is that which clings to my face ?
> What is it ? It is white new facial hair.
> Yes. New hair which has grown quickly, very quickly.

He then addresses his ancestors in these words :

> Look at my whiskers. They grow even as the sunbeams shoot
> from the horizon. Thay are as the soft down of the
> *ngar* plant. They are as black as the hairs on a bamboo shoot.
> Aye and as thick as the bristles on the *bonglifau*.

When he has finished rubbing and singing, he draws the bruised leaves down the sides of his hairless jaws and then returns home, well satisfied with his morning's work.

As I have already pointed out, black teeth are a mark of beauty and one of the principal items in a native's store of beauty magic is a spell to cause the teeth to become black and present an unbroken appearance. The natives know, of course, that the discolouration of the teeth is due to eating betel-nut dipped in lime, but they feel that the best effects are only obtainable with the help of magic. A man whose lips protrude owing to the thick layer of hard black cement which lies over his teeth and fills up every dental interstice, according

to native belief, has undoubtedly obtained the aid of an ancestor once famed for his sparkling black teeth. He has used areca nut over which the following spell has been intoned :

O, betel-nut, fasten yourself in the front of my teeth,
Fasten yourself in the back of my teeth.

O, Selamuson, my ancestor, comes and rubs my teeth
with betel-nut and fastens them up.

Aye, and Tongita my ancestor also comes and rubs my
teeth with betel-nut and fastens them up.
O, betel-nut, fasten yourself in the front of my teeth.
Fasten yourself in the back of my teeth.

O, betel-nut, sew them up tightly, sew up these interstices
at the back of my teeth. Yea, and those at the
front of my teeth.

Another of these spells contains the phrase :

The women talk of me among themselves and all desire me
as a lover, so black and so shining are my teeth.

One day while I was talking over this type of magic with one of the most outstanding men on the island I learnt that these spells were "*waran/kepma:li*" i.e. "prerequisites of/social prominence", and were necessarily known only to social leaders, such as celebrated feast-makers and successful warriors. There are many other such spells all having the object of improving the appearance of the spell-maker, in accordance with local standards of beauty.

In addition to these magical aids to beauty, a Tangan swain always takes much trouble over his toilet. He rubs his body with scented coconut oil, removes the hair from his chest (for fear of being thought too old), adjusts bundles of perfumed herbs around both his neck and his waist, dyes his lips a flaming red, paints his forehead and nose a dazzling white and proudly pins a coronet of bird's down upon the orange coloured hair of his head. Perfumes especially are regarded as strong aphrodisiacs and during their preparation spells are sung into them in order to increase their natural powers of attraction.

Love Magic.

I have analyzed the magical procedure relating to love and have found that there are five different methods of obtaining control over the personality of the loved one.

Of these methods, probably the most popular is that which relies for its efficacy on the consumption by the victim of a portion of bespelled food. A variant of this method is to introduce into the victim's food a few drops of blood from the solar plexus (the seat of the emotions, according to native philosophy) of the spell-maker.

Another popular form of love magic is to obtain possession of some object which has made close contact with the victim and to use this object as a medium of amatory influence.

Again, in accordance with the theory generally held in Tanga, that the sense of smell is a ready agent of the supernatural, a common feature of much love magic is the magical impregnation of the victim by means of perfumes. The odor of certain bespelled objects is drawn in by the victim and, settling in the lower part of the lungs, " turns her belly over " as the native phrase goes.

A much smaller proportion of love magic depends for its success on the suggestive powers of the eyes. Certain objects such as a bright-hued girdle or a particularly vivid flower, over which magic has been made, are displayed before the victim and the mere sight of these objects is believed to complete the magic circuit.

The final method of inducing erotic sympathy is by pictorial representation of the loved one. There is a small limestone cave on the beetling cliffs of the north coast of Boieng Island which is devoted to this particular aspect of love magic. Crude drawings in red dye of the desired woman are painted on the walls, and she whose picture is so produced is then summarily commanded by the spell-maker to surrender herself to him.

Although you are now conversant with the five main principles of Tangan love magic, perhaps a description of the application of one of these principles will lead to a clearer realization of the practice and function of the art of love.

A man from village A has fixed his affections upon a girl from village B and is about to launch a magical attack upon her heart or rather-solar plexus. As the condition of the performer is an important consideration in any account of magic, let us examine this man from village A. We find that during the course of his performance, he avoids all foods or drinks which are likely to reduce his body heat. In fact, he does not drink at all and eats only food which has come steaming hot from the oven. The natives claim that such a man is easily distinguishable by his lean and anxious appearance. As we would say, " The man is in love ", so they say, " He is performing love magic."

The rites as well as the formulae are kept strictly secret. The man from village A visits his garden in secret and plucks a bunch of wild ginger roots. He ties this bunch of wild ginger to the end of a small length of thin bamboo and carefully hangs the ginger from the branch of a tree nearby. After exposing it to the sun for three days, he returns to the tree and removes the bulbous portion. This, together with other parts of the ginger plant he places in the interior of a very prickly bush. Sexual desire seems to be equated in the native mind with enhanced body heat. Thus the use of ginger and hot foods and the exposure of the ginger to the heat of the sun. The drops of moisture which appear on the ginger-root after its exposure represent the tears of the loved one as she cries for her lover, whilst the placing of the bespelled object in the midst of a clump of prickly leaves represents her firm ensnarement. His next move is to select a spot along the cliffs from which he can look down upon village B. The following morning he retrieves his ginger from amidst the prickly bush and proceeds to the selected spot on the cliffs. Being certain that he is sufficiently hidden from any prying eyes, he then turns towards village B and holding the ginger plant in his left hand, sings the following spell into it :

Go, Ginger-root of mine and climb up to her !
Climb up and over that arm of hers !
Go Ginger-root and climb up to her !

There are many repetitions here which would only weary you. The final adjuration, however, runs as follows :

> " Ah Bibi, I am gazing fondly at you. I am approaching you. You are thinking ' Who is this man who approaches?' You are thinking 'He is close to my heart, aye, close to my lungs.' You are thinking only and exclusively of me. You are looking constantly at the track which enters your village. You await my coming and cry constantly for me."

On concluding the sing-song recital of the formula, the performer restores the ginger-root to its hiding place among the prickly leaves of the bush. The next morning he repeates the procedure of the previous day and awaits a favourable omen. This takes the shape of a fluttering butterfly, which alights upon the bunch of ginger which he holds in his left hand. This phenomenon convinces the man that his message has reached the woman since the butterfly is regarded as a symbol of her dream soul.

Once having confirmation of the success of his charms, he decides to visit the girl and garner the fruits of his magical victory. There are many other details to be attended to before final success comes his way but no real obstacles now lie in his path. He goes forward with a stout heart and a steady confidence in his powers of seduction.

Group Sex Rites.

Such beauty magic and love magic as I have so far described is practised in secret by individuals. I shall now describe two rites which are predominantly sexual in character and which are performed in public[3] by a group. Both of these ritual performances are closely associated with the celebration of certain death rites. As the Tanga say, they are *tel so n'kinit*, i.e. they are appropriate to the death ceremonies. They are celebrated rather late in the long cycle of Tangan funeral rites and represent a form of release from the inhibitions of the mourning period.

The first of these rites are known as *malera* rites and the practice of them is confined to males who have been able to pay the necessary fees to the organizing chieftain for tuition in the singing of special songs, in the manufacture of special masks, in the preparation of special perfumes and in the making of special magic.

All of these activities are carried on in a building called *ful'n malera*, situated in a stockaded clearing in the jungle adjacent to the organizing chieftain's own family settlement and all are directly connected to the problem of finding a suitable sexual partner. It is usual for between twenty and thirty young men to offer themselves as candidates for initiation into the secrets of *malera*, including, of course the secret of manufacturing the magnificent *malera* masks worn only by fully-initiated members during the dance held at the conclusion of the initiation ceremony.

The candidates are conducted to the *ful'n malera* by the organizing chieftain and shown a most elaborate head-dress made of bark-cloth bearing painted designs, built up on a frame-

[3] Much of the behaviour associated with these rites occurs under cover of darkness. Although it is " public " behaviour and all the participants have a fair idea of how their neighbours are acting, it is not good " form " to indulge openly in certain sexual practices. The pretence that nothing unusual is occurring is strongly maintained by all participants.

work of cane and decorated with coloured feathers. Each one then pays the chieftain a fee consisting of a fathom of small-shell currency or a single clam shell disc and is allowed to examine the mask in detail and note especially the design elements which have been painted on it. And now occurs a somewhat strange incident. Whilst they are examining the mask, loud shouts are heard outside the house and a most magnificently arrayed figure of a prancing dancer reveals himself to them. They are then told that the first mask shown to them is a counterfeit mask and that the lone dancer wears the genuine mask. They rush over to him and call upon the chieftain to begin instructing them immediately in the art of *malera* mask design and manufacture. He informs them that they must first subject themselves to certain magical preparations and accept certain ritual prohibitions before they are in a fit state to be instructed. Each candidate is then painted with a bright yellow dye on the temples and the upper lip and from the breast bone to navel. The dye is made to the accompaniment of a powerful love spell and in being transferred to the body of the initiate thereby imbues him with its magical efficacy. In other words, the body decorations give the wearer a certain sexual allure which he previously lacked. Each candidate is then placed under a strict taboo against drinking rain water, eating cooked food or sexually indulging himself whilst under instruction.

The first piece of instruction given the initiates is chemical in character. They are shown how to prepare an aphrodisiac–consisting of a mixture of coconut oil and other essential oils. A large quantity of this highly perfumed oil is made and kept in coconut bowls which hang from the central ridge pole of the *ful'n malera*. Every candidate anoints himself daily with this oil and from now on receives careful lessons in how to make the elaborate *malera* masks, how to prepare the dyes used in decorating them and how to combine the various design elements so as to produce the accepted *malera* pattern.

Between lessons, it is usual for several candidates to arrange themselves in opposing pairs inside the *ful'n malera*, each pair having between them a coconut shell container full of perfumed oil swinging from the ridge pole. Each man of each pair then attaches a cord to the swinging bowl of oil and pulls it towards him and lets it swing away from him and towards his partner. The action is similar to that of a pair of men using a cross-cut saw and is always accompanied by song. A typical example of one such incantation goes like this :

1st. Verse : For you, Tinwatma:li, Yes, for you
Are we two men squeezing out this perfume
So that you will admire my hair.
Yes, even stare at it in wonder !

2nd. Verse : For you Tinwatma:li, Yes, for you
Are we two concocting this perfume
So that you will gaze at my hair
Yes, even stare at it in envy !

3rd. Verse : For you, Tinwatma:li, Yes, for you,
Are we two shaking this perfume
So that you will look on me with approval,
Yes, even stare longingly at my hair !

I was informed that, as a result of the back-and-forth swinging action, small amounts of the perfume splash out of the coconut container and scent the surrounding air. Indeed, it is believed that the perfume travels through the air until it finally reaches the loved one who then becomes affected with desire for the particular man concerned. Magic is conveyed by means of the sense of smell.[4]

When all the candidates have learned how to make the *malera* masks to the satisfaction of their tutor, a feast is held to celebrate the event. At the conclusion of the feast, the initiates leave the *ful'n malera* and, selecting a large tree in a clearing in the jungle adjacent to a stockaded family settlement, they strip it of all its foliage and hang feathered streamers from its boughs. They then bind a tall bamboo pole to the upper portion of the main trunk of the tree. This pole, which is called *tulu*, is fitted with imitation branches and decorated with feathered garlands. However, its most important accessories are in the form of love charms belonging to women whom the candidates desire to attract sexually. These charms are generally portions of female attire which have been discarded or stolen from the women in question. They are stuffed down the hollow stem of the bamboo *tulu*.

The candidates then climb the tree and to the accompaniment of a bamboo musical instrument known as a *timbuk* and in the sight of their friends and of the women whom they are wooing, they begin singing and shaking the tree in time with the music. Each singer directs his song at a particular girl in the audience[5] and one such song goes something like this :

I am singing so well that your belly must turn at the sound,
Yes, on hearing my song, even your mother must yearn after a man,
Yes, even your mother !
Look up constantly at this little love charm which belongs to you,
And which is now in the *tulu*.
Yes, get up and look upon me,
For soon, I shall finish my song !
Yes, it even causes your mother to cry out after a man !

After singing in this fashion for about an hour, the candidates descend from the tree and, led by the organizing chieftain, return to the *ful'n malera*. They tie up their hair in tufts and don the spectacular *malera* masks. They then form single file and return to the adjoining family settlement where, to the accompaniment of a great deal of shouting, they parade before their relatives and friends for about thirty minutes. They then leave the settlement in a body and return to the *ful'n malera*. The wonderful masks are then removed and completely destroyed by fire in order to avoid the possibility of any uninitiated person finding them and learning how to make them. The candidates then return to the village settlement and mingle with their relatives and friends. It is at this stage that the love magic

[4] It surprised me to find how few references there are in the literature to the magical function of perfume. Haddon mentions it in his " Reports of the Cambridge Anthropological Expedition to the Torres Straits ", V, 211 and Malinowski says that " the sense of smell is the most important factor in the laying of spells on people " and " love charms are borne into the victim on the scent of some spellbound aromatic substance " (*Sexual Life of Savages*, 378).

[5] In addition to directing his singing towards his chosen woman, a candidate often utters her name aloud and at the same time ejects from between his lips a fine spray of spittle impregnated with the macerated root of the ginger plant. Here again, the belief is that the desired girl will smell the ejected spittle and, having thus inhaled the magic, must inevitably turn her thought towards the performer.

begins to " pay off " and it is rare for any young man who has obeyed the instructions of the chieftain in charge of the rites to fail to capture the erotic attention of his chosen sexual partner. The principal—indeed, the sole—function of the whole cycle of *malera* rites is to rationalize the otherwise irrational pursuit of sexual satisfaction. Here is an instance of a society which has successfully organized a school for lovers.

The second of these " group " sexual rites goes under the name of *rang-un*. I was present on three occasions when these were being celebrated and the account here recorded is that of an eyewitness who knew many of the participants personally and who himself was accepted by them as a friendly observer.

As in the case of the *malera* rites the *rang-un* ceremony is always associated with the commemoration of the dead and especially with the celebration of the death of a female relative. The chieftain responsible for organizing a *fun rang-un* follows the usual procedure associated with the building of a funeral house[6]. Upon completion of the structure, he invites all who have had anything at all to do with the erection of the house to an all-night festival of singing and eating. It is, essentially, a type of house-warming ceremony.

The last such ceremony which I attended was held at a place called KA:BEL, the home of a friend of mine named Tuktuka. After enjoying an evening meal of roast pork, sweet potatoes and coconut pudding, inside the men's house, I was invited by the aged chieftain to sit beside him on the ceremonial food bench, at the end of the village square, and to watch the proceedings from there. The new funeral house was pointed out to me but, as I had seen scores of them by then, I did not attempt to enter the house nor did my host invite me to do so. The night was moonless and very soon, the only light entering the clearing came from the stars above and the torches of guests arriving from neighbouring villages. As I chatted with the old man, I noticed that the women seemed to be crowding into the new funeral house whilst the men sat outside, either on benches or along the outer walls of the house.

My curiosity finally got the better of my good manners and I strode over to the doorway of the house and flashed my torch inside. There must have been a hundred women packed close together along both of the inner walls of the house. On returning to my seat, an old woman began to sing the first verse of what I later learned was a *rang-un* song cycle. As soon as she had finished the verse, everyone present, both men and women, joined most heartily in the singing of the chorus. I particularly remember an informant who was giving me some details of the ceremony, breaking off his interview to add his voice to the swelling chorus of song. As the night wore on, other song leaders, both male and female, commenced various song cycles and rival groups taunted one another regarding the quality of each other's singing.

It was close to midnight before I saw anything to suggest that this affair was anything more than a choral festival. I then had occasion to require the presence of my servant Bidlik. A friend of his informed me that he was in the funeral house. This information appeared somewhat strange to me as I had kept a careful watch on the house and the only persons I had seen entering it were women. I asked Bidlik's friend for an explanation and he then told me that the women only occupied about half of the funeral house, that there was a partition with an opening in it, which separated the women's section from another

[6] See Chapter VII of my *Primitive Melanesian Economy*, A.N.R.C., Sydney, 1955.

section at the rear of the house and that this rear section was full of men *and* women. The following morning I asked Bidlik what went on in the house, under the cover of darkness and song, and I was left in no doubt as to the nature of the practices there indulged in. No intercourse took place inside the house itself but assignations were made, areca nuts were exchanged, and desires were satisfied in the privacy of the adjoining jungle. I emphasize the "private" character of sexual behaviour in this society. Although the *malera* rites and the *rang-un* ceremony are both forms of institutionalized sexual indulgence by groups, all of the participants in such rites are most careful to observe the proprieties.

Whilst present at another *rang-un* ceremony, which took a different form to the one I have just described, I was told that when a young man, who is generally accompanied by his wife, wishes to meet another woman outside the funeral house, the traditional excuse offered for wishing to leave the house is that he is thirsty and wants a drinking coconut. Once outside the house, he creeps along beneath the eaves until he is opposite the girl of his choice, parts the leaf wall and pulls her outside. On his return to the house, his wife asks him why he has been so long getting a drink and he then explains that all the nearby coconuts having been commandeered for the feast, he had to go a long way to find a suitable palm. She knows perfectly well where he has been and what he's been doing but in order to preserve the proprietries, he must offer the traditional excuse and she must ask for the traditional explanation. Both are generally forthcoming and both are always accepted. The interesting aspect of such social behaviour is the existence of such machinery for the concealment of infractions of the marriage bond. One can hardly avoid coming to the conclusion that during such rites, the ordinary prohibitions against adultery are non-operative. These are times of ceremonial licence when the ordinary canons of behaviour do not apply.

Conclusion.

It is not possible within the limits of this address to report and consider such aspects of the culture as the large number of sex taboos which are in force ; as the many rites connected with the married state, such as pregnancy rites, birth rites, menstruation rites, adultery rites and divorce rites ; as the place of sex in legend and myth and finally—as those avoidance rites which stem from the basic kinship taboo existing between brother and sister.

What I do hope I have demonstrated to you this evening, by my consideration of such ceremonies as *dafal*, *malera* and *rang-un* and by my accounts of beauty magic and love magic is that these people have certain rules of sexual behaviour which they respect as carefully as or even more carefully than we do our own code of sexual morality. I would also like to emphasize the fact that among the imponderables or mysteries of life in Tanga, sex looms large. It is recognized as a force which must be handled carefully and about which the advice of the ancestral beings must be taken. Finally, I would like to leave you with the thought that the Tangan lover, with his rhapsodic love incantations and his dependence on such frail messengers of love as passing birds and butterflies is not far removed from our own conceptions of the romantic lover.

F. L. S. Bell.

Australia: Ethno-ecology. **Cleland.**

Our Natives and the Vegetation of Southern Australia. *By Professor J. B. Cleland, C.B.E., M.D., Ch.M., University of Adelaide.*

Oecology, as the Oxford dictionary prefers to spell it, is that " branch of biology dealing with living organisms' habits, modes of life, and relations to their surroundings." Its etymology is from the Greek *oikos*, " a house, abode, dwelling, and place to live in " (Liddell and Scott) and *logos*, " a word . . . story." Economy, which was once spelt oeconomy, is the " administration of concerns and resources of a community " from *oikonomos*, managing a household (*nemo*, to apportion, allot, manage, control). It is interesting to note that *nemos* or *nomos* means a pasture and a nomad (the Oxford Dictionary sticks to the Greek omicron), which our native is sometimes erroneously called, is a member of a tribe roaming from place to place for pasture. The verb and the noun seem, however, not to be related. The original meaning of ecology, that of knowledge dealing with the house or home, a human fabric, has been extended, as one sees from the dictionary definition, to embrace all the relations of the surroundings to a living organism or group of organisms. *We are to discuss the ecology of our natives as regards the vegetation that surrounds them.* Two broad aspects present themselves. Did their presence lead to any profound or even slight alteration in the vegetation? What did they make of the vegetable products that were available? Under the first category we should perhaps consider first what animals other than man can modify the vegetation and so lead up to primitive man and on to the deplorable spoliation of civilized man. The origin and effects of fire have also to be considered. Under the second category come such matters as vegetable foods, implements of wood, plant sources of water, making of wurleys, use of narcotics, and so on.

Have Significant Changes in Natural Vegetation been Produced by any Animals not Introduced by Man?

I cannot recall any examples of profound change. Apart from human interference the animals and plants of a region seem to have reached a stage of equilibrium round about a mean. Did an animal such as the lemming increase unduly in numbers, predators and disease soon reduced these to a normal population. The great herds of bison in America and of antelopes in Africa may have altered the flora in the regious they affected, but if they have done so, a new equilibrium had been reached long ago. Beavers, by their constructive work, may have altered the course of streams. The distributors of mistletoe berries and native fig seeds have been kept in check by birds of prey. The grass ravaged by hordes of locusts soon recovered. We now of course have no idea of what species of plants may have disappeared for ever during these oscillations.

It is now considered that extensive changes of climate have occurred within the last 10,000 years. Mt. Gambier and other volcanoes were active about 2,500 years ago. Drier climates and wetter ones have alternated. With each of these changes major adjustments of the balance of nature must have taken place. We see to-day relic plants of a wetter period on mountain tops and rocky fastnesses in Central Australia and our far North—a cycad, a palm, a grass-tree (*Xanthorrhœa*) and so on. These climatic factors, however, do not concern us. Till civilized men came on the scene, animals had not materially changed the vegetation.

When primitive man gradually evolved from his sub-human ancestry, three things helped him to rise: his intellect, the elaboration of speech, and later of writing, and the possession of hands. Without hands and without speech he could not have dominated nature. His discovery of how to make fire was a major event in progress. How civilized man has altered the face of nature we all know to our cost.

What Changes have our Natives Produced in the Vegetation of Australia?

It would seem that they have produced singularly little. Our natives are hunters and food-gatherers, nomadic in their habits but having no herds, they did not "roam from place to place for pasture." They had no agriculture and no fixed abode. There was no need to destroy large areas of natural vegetation. In fact, it would have been contrary to their interests to do so. They fitted naturally into the ecology of the land they inhabited and might have continued to do so indefinitely. Mr. Strehlow is of the opinion that they had reached the zenith of their existence and were actually in a mental decline. They did bring with them, however, the knowledge of how to make fire. Even though they may have been here for much more than 10,000 years, I think they brought that knowledge with them. I doubt whether that major discovery of how to make fire by friction was discovered more than once. Since vegetable products are essential for its production, we are entitled to dwell on this subject.

Fire occurs naturally in connection with volcanic eruptions. He must have indeed been a bold man who made fire his servant from such a source, blazing trees and glowing logs at the edge of the destruction.

Lightning is a common source of bushfires in Australia. I have myself seen three blazing hill-tops near Yardea in the Gawler Ranges where a recent thunderstorm had set alight to the tufts of *Triodia*, the so-called spinifex. Man's intelligence led him to add sticks to such a fire to keep it going. (An ape may enjoy the warmth of a fire, but would not think of feeding it.) The carrying away of glowing sticks would naturally follow. Tropical downpours would put them out. Fresh thunderstorms then would eagerly be awaited.

But who first noticed that rubbing two sticks together produced a feeling of warmth? And who recognized that this warmth was the same as the feeling produced by a thunderstorm fire? Sharpening a wooden spear point by rubbing it on a stone was what probably led up to the discovery. Extra vigorous rubbing may have produced smoke. What a thrill! A master-mind, a Newton of countless ages back, grasped the possibility of how to make an actual fire after perhaps generations had amused themselves with producing smoke.

Mr. N. B. Tindale tells me that he has evidence which suggests that our natives also obtained fire from flint or other hard stones—the native name of the creek where pyrites is obtained near Nairne means "fire-stones." There is a legend about a whale and a shark and the stealing of fire-stones, and flints have been found which may have been used for this purpose. If iron pyrites happened to be part of a stone caught in a hot fire of sheoak wood, I understand from metallurgists that oxidation may be started, and when started may continue till all the available pyrites is reduced. One form of sulphide of iron is liable to spontaneous combustion. Such events might readily give rise to the native name meaning "firestones," which after all is what the word pyrites means. Mr. Tindale has shown me that sparks can be readily obtained by striking iron pyrites with a flint and a fire started.

The Australian vegetation, both on the plains of the interior and in the savannah and forest lands of the south, is remarkably resistant to the ravages of fire. One has only to visit the stringy-bark areas of the National Park, which have been swept by fires on many occasions, to see how quickly the vegetation will recuperate. Within a week or so of the fires the eucalypts will be seen sending out shoots from the trunk and main branches. The root-stocks of many shrubs send out shoots. Have these plants acquired the capacity to survive fires or, which is more likely, is the present flora comprised of those that happened to possess recuperative properties, and have many fire-sensitive plants disappeared? As already mentioned, it is certain that fires from lightning took place from time to time in Australia before the coming of man. Obviously the frequency and extent of bushfires must have increased greatly since fire-producing man arrived. Apart from the accidental escape of fire, the natives, especially in the interior, deliberately set fire to the country in places and at times to drive out game. One of the earliest references to this is in George Caley's report of his visit to the Cow Pastures, south-west of Sydney, in 1803 or 1804. He came upon " A large party of natives catching kangaroos by setting the grass on fire."

I knew of nothing to suggest that such firing by the aborigines has altered the covering of vegetation, for instance, by open grassy areas replacing forest, or by the burnt country being especially subject to wind erosion. Since the coming of the white man with his sheep and cattle and rabbits, the situation has profoundly altered. Young mulga and saltbush coming up after a fire are very liable to be eaten off before they can establish themselves.

It is doubtful, therefore, if fire, as used by the natives, has caused any profound change in the vegetation. As there were no herds of suitable animals for the native to become a herdsman, and so a nomad in the more literal sense, and as he did not practise any form of agriculture, these two causes of alteration to the vegetation do not come into the picture. The aborigines, under tribal conditions, were almost entirely confined to more or less limited areas. There is again nothing to suggest that even within tribal limits he disseminated the seeds of any food plants. Being completely naked, at least in the interior, he had no clothing in which seeds could become entangled. There are two ways in which the native may have played some part in maintaining the balance of nature. Large white juicy and, to the native delicious grubs of certain moths and beetles infest species of Eucalyptus, Acacia, codonocarpus (Native Poplar), Roly Poly (*Salsola kali*) and other plants. The natives extracted these whenever possible and so must have protected many trees. Myall (*Acacia sowdenii*) on the west coast is now heavily infested with mistletoe. The natives eat the fruits, and it is likely that to some extent they at one time helped to keep this pest under control.

Uses Made of the Vegetation by the Natives

In my Clive Lord Memorial Lecture to the Royal Society of Tasmania in 1939 (Papers and Proceedings, 1939 (1940)), under the title of " Some Aspects of the Ecology of the Aboriginal Inhabitants of Tasmania and Southern Australia," I have given a fairly full account of the uses made by the natives of the plants around them. I do not propose to go over this ground again, except in an abbreviated form, but I have added in appropriate places such information as I have supplementing that printed in the Tasmanian paper. It should be further mentioned that the following accounts are by no means exhaustive.

Thus there is a wealth of material collected in R. Brough Smyth's " The Aborigines of Victoria " dealing with vegetable products used by the natives. The papers on the same subject by the late Professor T. Harvey Johnston and myself also contain many references to the literature as well as information collected by ourselves. Professor Johnston was a man of extraordinary industry and of wide reading, and most of the references to other work admirably epitomized appearing in these papers were the results of his diligent search. These papers, including some of my own, are to be found in MANKIND, Vol. 2, No. 1, April, 1936 ; *Trans. Roy. Soc. of S.A.*, LVI, 1932, p. 36 ; LVII, 1933, p. 113 ; LXIII, 1, 1939, p. 22 ; LXIII, 2, 1939, p. 172 ; LXVII, 1, 1943, p. 149 ; LXXVII, 1954 (with N. B. Tindale) ; *Oceania*, IV, No. 2, 1933, p. 210, " The History of the Aboriginal Narcotic Pituri " ; and No. 3, 1934, p. 268 ; VIII, No. 2, 1937, p. 208 ; and No. 3, 1938, p. 328 ; *Records of the S.A. Museum*, VIII, No. 3, 1946, p. 447 (with T. D. Campbell and P. S. Hossfeld). These should be consulted for many records of plants used by the natives and not incorporated in this paper. Many native names for plants are also given.

The authors of the scientific names of the plants mentioned will be found in J. M. Black's " Flora of South Australia."

Uses Made of Plants for Food

Every possible plant substance capable of yielding nourishment for man was, as occasion required, utilized by the natives. In some instances the amount of nourishment obtained must have been so small that such sources would only be resorted to in times of stress and imminent starvation. In spite of the extreme scarcity that must have prevailed in the dry interior from time to time, and to which many individuals hah probably been exposed on more than one occasion during the course of their lives, there is no clear evidence that deficiency diseases such as scurvy, beri-beri or rickets occurred amongst aboriginals living on the natural products of the country. This statement should be qualified perhaps by mentioning the high frequency of distended abdomens in small children in parts of Central Australia and the bowing forwards of the femora and tibiæ known as boomerang legs. The first-mentioned may indicate some unsuitability or deficiency in the food available, and the latter Dr. C. Hackett considers entirely due to a form of yaws, though I believe that there may be an independent but associated metabolic disturbance and a deficiency of phosphorus has been noted. The natural diet of the natives seems, therefore, to have been in general a well balanced one in spite of the seeming poorness in quality of some of the constituents. The Aborigines starved to death in times of drought, but, as might be expected, did not die from deficiency diseases. In striking contrast, scurvy developed at Hermannsburg Mission Station in 1929, when the prolonged drought prevented the natives, who were on a poor European diet deficient in fresh foods and lacking in green vegetables, from supplementing their rations by " bush tucker." Myall natives, men, women and children, coming in from " out-back," appeared like walking skeletons but free from scurvy, whilst the more filled-out and flabby mission ones suffered from this complaint, with some fatal issues.

The chemical composition of some plants used by Central Australian Aborigines as food has been investigated by Mrs. Dadswell (1934). The list includes *Solanum ellipticum, Boerhavia diffusa, Vigna lanceolata, Portulaca oleracea, Calandrinia balonnensis, Lepidium papillosum, Ipomœa* sp. and *Marsdenia australis*. Her conclusions are as follows : (1) These

native foods do not differ greatly from corresponding cultivated plants in regard to their organic composition ; (2) the inorganic constituents, with the exception of phosphorus, are plentifully supplied in the native foods ; (3) phosphorus exists in such quantities as to make it difficult for the natives to obtain adequate supplies of it if they are to live on a vegetable diet.

I know of few examples of our natives in the wild state storing food for future use. In fact, with their usual wandering life it would be difficult for them to do so. However, in " Wild Life," November, 1946, p. 388, a contributor, W. J. Tohl, stated that on occasions the Aborigines dried quandongs and kept them stored for future use. I wrote to the Editor asking whether he could ascertain from his contributor the source of this information and whether he wrote from his own experience or had met with this statement in the literature of the subject. Also, the locality where it occurred and the name of the tribe. I received no reply. Probably the natives who did this had got the idea from contact with Europeans. Sir George Grey found a store of zamia nuts in Western Australia, and Mr. N. B. Tindale and C. P. Mountford know of examples of the storing of food in Northern Australia.

The following indicate the various types of vegetable substances from which food was directly obtained : Grains and seeds ground, made into a paste and cooked ; yams, tubers, roots and young shoots ; bark of mallee eucalypts ; green plants eaten raw or steamed ; fruits, berries and nuts ; gums and plant exudates ; honey sucked from flowers ; and some fungi.

Seeds Ground and Eaten

Grass seeds ground into a paste between stones and then cooked form quite an important article of diet in the northern parts of the dry interior, especially in the region of summer rains. Such a source of food is virtually not obtainable in the well-watered southern portion of South Australia. In the list which follows later of plants so used it will be seen that nine or more grasses have been thus identified, the grains being about the size of millet seeds ; abundant but minute seeds are furnished by two species of *Portulaca*, two of *Amarantus*, by one (or probably more) species of *Chenopodium* and by other plants ; the small seeds of the Coolabah Eucalyptus are used on the Diamantina ; the spore cases of *Marsilea*, when ground looking like curry powder, helped to sustain King, the survivor of the Burke and Wills Exploring Expedition on the Cooper. Acacia seeds of several kinds are larger than many of the others ; still larger are the seeds of the Desert Kurrajong.

At MacDonald Downs, in Central Australia, the native women gather handfuls of grass grains and chaff, which have been laboriously collected round their holes by little black foraging ants on the flood plains beside the watercourses. These grains are then winnowed in coolamons after being dehusked by a rotary milling action with the feet in a hole in the ground. In the Musgrave Ranges the seeds of the Desert Kurrajong are often found in numbers round rock holes, so numerous indeed that the women collect and grind them. The trees themselves, however, grow far out on the desert sandhills. Crows, Mr. N. B. Tindale has recorded, feed in these trees, apparently eating the material in which the seeds are embedded in the pods. As the crows have to fly back to the ranges for water, the seeds are there voided by them. These are two good examples of man's ecological relationships in which adjuvant factors, the ants in the one case, the crows in the other, play a part.

List of seeds ground between stones, made into a paste and cooked :

FILICALES : Sporocarps of *Marsilia Drummondii* (Ngardu).

GRAMINEÆ : Panic grasses—*Brachiaria distachya, Paspalidium jubiflorum, P. gracile, Panicum decompositum, Ichnanthus australiensis* (=*Panicum pauciflorum*). Other grasses—*Eriochloa punctata* (probably, Diamantina), *Pappophorum avenaceum, Astrebla pectinata* (Mitchell Grass) and *Dactyloctenium radulans* (Button Grass).

POLYGONACEÆ : *Rumex crystallinum, Polygonum plebejum.*

CHENOPODIACEÆ (Goosefoot Family) : *Chenopodium rhadinostachyum.*

AMARANTACEÆ : *Amarantus Mitchellii, A. interruptus.*

PORTULACACEÆ : *Portulaca oleracea* (Munyeroo), *P. intraterranea.*

LEGUMINOSÆ : *Acacia notabilis, A. tetragonophylla* (Dead finish), *A. dictyophleba, A. Kempeana* (Witchetty Bush), *A. Burkittii, A. ancura* (Mulga), *A. stipuligera, Cassia eremophila.*

MALVACEÆ : *Sida corrugata* var. *goniocarpa.*

STERCULIACEÆ : *Brachychiton Gregorii* (Desert Kurrajong).

MYRTACEÆ : *Eucalyptus intertexta.*

CONVOLVULACEÆ : *Ipomoea* sp. (Diamantina).

BORRAGINACEÆ : *Heliotropium* near *H. tenuifolium* (Mt. Liebig).

BERRIES AND FRUITS

The Native Peach or Quandong (*Eucarya acuminata*) is widely distributed, and the thin fleshy part of the fruit much sought after. In coastal areas and saline ground in the interior the dark purple fruits of the Nitre Bush (*Nitraria Schoberi*) are eaten. Where these grow along the coast and inland, the slightly salt and sweetish fruits of the Pig Face or Mesembryanthemum (*Carpobrotus æquilatorus* and its allies, and probably *Sarcozona pulleini*) are consumed. In southern parts it may be considered certain that the fruits were eaten of the Native Currants (*Acrotriche depressa*—Epacridaceæ, and *Leptomeria acida*—Santalaceæ), the Native Cranberry (*Astroloma humifusum*—Epacridaceæ), the Native Cherries (*Exocarpus cupressiformis* and probably *E. strictus*—Santalaceæ) and the Muntry (*Kunzea pomifera*—Myrtaceæ), which tastes of apple. In Central Australia the purplish fruits of the Native Plum (*Santalum lanceolatum*—Santalacæe) were consumed.

The Native Fig (*Ficus platypoda*) spreads itself over masses of rock in the Musgrave and Everard Ranges, but does not extend further south than to some rocky granite outcrops scattered here and there west and a little south of the latter range. The ripe figs are eaten raw or dried and ground into a paste. Mr. N. B. Tindale has called my attention to a reference in Schurmann's vocabulary of the Parnkilla language to a small kind of native fig found from Port Lincoln to the Gawler Ranges. This cannot be a species of *Ficus*, and the best suggestion I can make is that it referred to the fruits of Mesembryanthemums—a South African species is called Hottentot Fig. The mushy fruit, with its small embedded seeds, is not unlike a soft luscious fig.

In Central Australia the fruits, green marbled with white, of *Solanum ellipticum* are eagerly searched for and eaten by the natives, but I found them rather bitter. At present, probably several species are comprehended under this name. At Yuendumu, for instance, a prostrate plant with smaller fruits than the more widely dispersed form has been identified

as *S. ellipticum*. In the Musgrave Ranges there are two very similar species. An amusing incident occurred in the Mann Ranges when, in August, 1954, we met with a group of several hundred natives out " dogging." I had gathered a large-fruited form of *S. ellipticum*, and holding up the only ripe fruit I had, asked a native boy, " Can you eat this ? " He promptly proceeded to show me that he could, and the berry was only just rescued in time ! The pig-fruited *S. phlomoides* and *S. nemophilum* are eaten at the Granites in Central Australia.

The fruits of *Solanum esuriale* and *S. vescum* F. v. M. were eaten. The name esuriale, as J. M. Black points out, was given to the former on account of its being a food, from *esurio*, to be hungry. According to Baron von Mueller, the orange fruits of *Solanum aviculare*, to which the name " Kangaroo-Apple " is applied (see quotations in Professor E. F. Morris's " Austral English," 1898) are poisonous. They appear, however, to be eaten and I have tasted them myself and found them not unpleasant.

Inland from the Great Australian Bight, according to Annie F. Richards (1882), the berries of *Solanum hystrix* (" walga ") and of *S. simile* (" quena ") were eaten. In the case of the former, which extends from Fowler's Bay as far north as Ooldea, the dry prickly calyx and the seeds were removed, but the fruit of each, if too much was eaten, was liable to cause sickness. *S. simile* has smooth purplish berries. Here also the Parakelya (*Calandrinia balonnensis*) was eaten mixed with baked bark.

The following are also eaten :

The large fruits of *Capparis Mitchellii* Lindl. (Native Orange—Capparidaceæ, and at MacDonald Downs in Central Australia the fruits of two other species of *Capparis*). Fruits of a mistletoe (probably *Loranthus exocarpi*) growing on mulga and *Cassia* and of *L. Mitchellianus* and probably of several other species.

The Native Currant, fruits of *Carissa lanceolata* (*C. Brownii*) (Apocynaceæ), an important food in parts of Central Australia and a plant in consequence of ceremonial importance.

The drupes of *Scævola spinescens* are highly prized in the Flinders Ranges.

The scarlet arillas round the seeds of *Heterodendron oleifolium* (Bullock Bush—Sapindaceæ) in the Northern Flinders Ranges.

The fleshy fruiting perianths of *Enchylæna tomentosa* (the widely distributed Ruby Saltbush).

The small red or green drupes of *Pimelea microcephala* (Thymelæceæ).

Tubers and Roots

Large yams of *Ipomœa calobra* (Convolvulaceæ).

Tubers of the Nut-grass, *Cyperus rotundus* (yelka) (Cyperaceæ).

Roots of young plants of the trees *Erythrina vespertilio* (Bean Tree—Leguminosæ) and *Brachychiton Gregorii* (Desert Kurrajong—Sterculiaceæ).

Roots of the shrub *Clerodendron tomentosum*.

Tap roots of *Boerhavia diffusa* (Nyctaginaceæ), of the pea *Vigna lanceolata*, of *Erodium* sp. (Crow's Foot—Geraniaceæ) in the Flinders Ranges, and of *Tribulus occidentalis*.

The tuberous roots of *Thysanotus exiliflorus*.

" Small almost spherical tubers, six to twelve to each plant " of the sedge *Heleocharis sphacelata* are eaten without any preparation in north Queensland (Brough Smyth).

The yams of the widely distributed *Microseris scapigera* (Compositæ) were eaten even in the Adelaide Plains.

At Yalata, at the head of the Bight, children dig up and eat the watery tuberous roots of shaking grass (*Poa Drummondiana*).

The rhizomes of the Bracken Fern, the tubers of the water-growing *Triglochin procera* and *Scirpus maritimus*, the roots of the Bulrush, and the tuberous roots of *Oxalis corniculata*, as well as the bulbs of orchids, were all eaten.

The little Ulcardo Melon (*Cucumis melo* var. *agrestis*), about an inch long and the ancestor of the cultivated melon, is relished in the interior.

Leaves, Shoots and Pods Eaten Raw

The leaves, young shoots and follicles (pods) of *Cynanchum floribundum* and *Marsdenia australis* and the flowers and buds of *Pentratropis kempeana*, all Asclepiads, are greatly esteemed. The Native Clover (*Trigonella suavissima*) is eaten raw on the Diamantina. The stem and leaves of Munyeroo (*Portulaca oleracea*), a widely distributed plant, are eaten, as well as the ground seeds.

There are four species of Sow-thistle in South Australia, the ordinary one (*Sonchus oleraceus*) so common in cultivated areas, the Prickly Sow-thistles (*S. asper*) and *S. glaucescens* not quite so common, and a more robust species (*S. megalocarpus*) that grows on the coastal sandhills. The first two Black considers to be introduced plants, though Bentham thinks one or both may be natives. The last-named is certainly indigenous, but has a restricted distribution. *S. oleraceus* and *S. asper* of Black's "Flora" (really *S. glaucescens*) have reached the interior and have been recorded from Ernabella homestead in the Musgrave Ranges. Natives living amongst whites are known to eat at least the former. If it could be established that a true native name existed for the ordinary Sow-thistle, this would imply not only that it was eaten by Myall natives but that its occurrence probably antedated the European occupation. The required information seems to be forthcoming, as R. Brough Smyth, in "The Aborigines of Victoria (I, p. 210), quotes the Rev. Mr. Bulmer as stating that the natives of Gippsland ate the Sow-thistle raw and called it "Thalaak." This work was printed in 1878, so the information must have been supplied within about thirty years of the foundation of the colony of Victoria. I remember being greatly impressed as a small boy by seeing an insane native at Parkside eat a Sow-thistle, a thing that I have never seen a white person do.

Leaves and Stems Steamed and Eaten

The stems and leaves of a number of Cruciferous plants (cresses, etc.) are steamed between hot stones, often with intervening layers of succulent plants of the genus *Zygophyllum* to yield the required moisture. These include *Lepidium rotundum*, *L. papillosum*, *L. oxytrichum*, *L. Muelleri-Ferdinandi*, *Stenopetalum velutinum* and *Blennodia eremigera*. Plants of Parakeelya (*Calandrinia balonnensis*—Portulacaceæ), of *Bulbine semibarbata* (Liliaceæ) and of *Convolvulus erubescens* (Australian Birdweed—Convolvulaceæ) are also steamed and eaten.

On the Diamantina the stems of a tall species of *Polygonum* (*P. glabrum*) are pulled up, broken into pieces, placed in the fire and the pith then eaten.

Nuts

The exceedingly hard nuts of the native " Walnut " Tree (*Owenia reticulata*—Meliaceæ) are eaten by the natives in the neighbourhood of the Granites, C.A.

The Native Peach (*Eucarya acuminata*) is not recorded for further north than the Everard Ranges. The kernel inside the deeply pitted endocarp (" stone ") is eaten.

In Queensland, the nuts of the bunya pine and, after adequate treatment, those of cycads, were eaten. Brough Smyth quotes Sir George Grey as having found a store of by-ya (zamia) nuts in Western Australia. I do not know whether the nuts of the cycad (*Macrozamia Macdonnelii* F. v. M.) in the MacDonnell Ranges were used by the natives there.

Gums

Gums of the following are consumed : *Acacia lingulata* (Umbrella Bush), *A. notabilis* and *A. Kempeana*. Also of *Bauhinia Carronii* (Bean-tree—Leguminosæ), *Atalaya hemiglauca* (Whitewood—Sapindaceæ) and *Ventilago viminalis* (Supplejack—Rhamnaceæ).

The manna-like gum of *Myoporum platycarpum* (False Sandalwood—Myoporaceæ) has a pleasant, very sweet taste but, according to Helms, the natives do not care for it as an article of food because of some laxative properties it may possess.

A glutinous substance occurring in a thin layer on the inner side of the bark of *Brachychiton Gregorii* (Desert Kurrajong—Sterculiaceæ) is, according to Helms, only regarded as a makeshift food during periods of hunger.

Fungi Eaten

The large tough underground sclerotium of *Polyporus mylittæ* Berk. and Br., commonly called " Native Bread," was eaten in Victoria according to authorities quoted by P. Brough Smyth in " Aborigines of Victoria."

The late Rev. J. R. B. Love informed me in 1943 that the natives of Ernabella ate a " puff-ball " that appeared after heavy rains. Their presence was recognized by raised cracks in the surface of the earth. They were considered no good for eating after they had appeared above the surface—while still firm and juicy they were roasted in the coals. When cooked they became soft and both looked and tasted like arrowroot.

A dried specimen of *Boletus* sp., eaten by the natives of Ooldea, was given to me some years ago by Mrs. W. Tennant Cooke after a visit there. The sample was about 3 in. broad with a stem 3 in. long and spores mummy-shaped, pale brown, 10 to $11 \times 3 \cdot 5$ microns in size.

Brough Smyth has a record of the natives eating mushrooms. The carbonaceous *Montagnites candollei* Fr., collected at Ooldea Soak in August, 1939, had a native name " nin gerrba," so it was possibly eaten when young and presumably fleshy (unless the name signifies " useless " or has some similar meaning).

Foods Indirectly Derived from the Vegetation

These include galls, which may be directly eaten (mulga " apples ") or the large female coccid in the gall may serve as food ; lerp and waxy scales of coccids ; honey which again may be directly sucked from flowers, or may be gathered by the stingless native bee as

nectar from flowers or may be collected from plants by the workers of the mulga honey-ant and stored in the abdomen of a selected member ; and the large larvæ of certain moths and beetles that tunnel in the roots or the stems of trees and shrubs.

Mulga apples on *Acacia brachystachya* are caused probably by a gall wasp, *Trachilogaster* sp. (Hymenoptera—Perilampidæ).

Large rough woody galls the size of small apples are common on Bloodwood trees (*Eucalyptus terminalis* and probably allies) in Central Australia. They probably extend right across the continent, as I have seen them near the Strelley River in Western Australia. When split open they reveal a central cavity, white and smooth-lined, in which is a large juicy female brachyscelid, *Cystococcus pomiformis* Froggatt (Homoptera). The female of the coccid *Apiomorpha ovicola* Sch., found in a gall almost certainly on a Eucalyptus at Pandie on the Diamantina, is also eaten by the natives. Froggatt says this species has a wide range over Australia.

A wax scale, *Tachardia acaciæ* Mask., on sandhill mulga (*Acacia brachystachia*) was eaten at Ooldea (August, 1939). The Sugar Lerp, *Spondyliaspis eucalypti* Dobson, is widely distributed on Eucalyptus, especially *E. viminalis*, which has been called manna gum from the sweet-tasting shells of the insect. The name " lerp " is an aboriginal one. This lerp has been recorded on *E. dumosa*, and we have found it on *E. oleosa* and at Ooldea on *E. incrassata*, where the natives eat it.

I am indebted to Mr. Duncan Swan for the identification of these insects.

N. B. Tindale has recorded that scale insects (" ultukun ") on *Hakea multilineata* in the Mann Ranges produce a " Wama " or sugar used as food.

Sweet substances were rare in the diet of the Aborigines, and so eagerly sought after. A little honey was obtained by sucking *Hakea*, *Banksia* and *Xanthorrhœa* flowers. In the north-west of the State a little honey can be gathered at dawn from the flowers of *Thryptomene Maisoneurii*, a myrtle that is abundant on sandridges. The little stingless native bee, *Trigona*, can supply a considerable quantity of honey.

In 1945 the late Rev. J. R. B. Love sent to me from Ernabella some small lumps of a dark brown inspissated sticky sweet material that drips to the ground from the leaves, not the flowers, of *Hakea intermedia*. The natives called it " tjurratja," their name for anything sweet.

The honey stored up in what I understand are ordinary workers of the Mulga Honey-ant, *Melophorus inflatus*, must of course be obtained indirectly from plants, but the actual sources seem not to have been ascertained. These ants are found under mulga (*Acacia aneura*) and in such thickets of mulga, other flower sources than the blossoms of the mulga are few. Information is desirable on the length of time that this tree is in blossom, whether these ants visit the flowers, and whether there are other sources of sugars such as scale insects or mulga apples which, as has been suggested, may supply the sugar. Professor Badger tells me that the proportion of fructose to glucose in the ant-honey differs from that in ordinary honey.

Use of Narcotics, Etc.

The use of narcotics in the shape of pituri extended as far south as the Flinders Ranges. There was an extensive trade in pituri, which seems to have been entirely or partly the dried

leaves and small stems of the solanaceous plant *Duboisia Hopwoodii*, from the Mulligan River near the south-west corner of Queensland down the Diamantina to the Flinders Ranges. Here the pituri was exchanged for red ochre, which was traded back. In Central Australia, from the Musgrave Ranges to the MacDonnell Ranges and as far north at least as the Granites the dried leaves chewed by the natives were species of true tobacco (*N. excelsior*, *N. Gossei*, *N. ingulba*, *N. Benthamiana*, and probably other species). Other species of *Nicotiana* also occurred in these areas, which were not used by the natives. In Central Australia *Duboisia* is employed for stupefying emus by putting portions of the plant in the water of rock holes, but is not usually utilized by the natives for chewing. Whether the leaves are those of *Duboisia* or of *Nicotiana* or of both, they are dried and chewed into a quid, which may be steeped in the wood ashes of acacia trees before use so as to facilitate the liberation of the narcotic.

Early in 1954 Mr. W. B. MacDougall forwarded me material which Mrs. E. Robertson identified as *Nicotiana goodspedii*. He did not know how reliable his information was, but one native told him that only the roots were used as pituri for chewing, and another that the leaves were dried and then used as well as the roots. Both said that it was very potent. The Kokota name given was " towell-towell " or " dowell-dowell." Mr. MacDougall found it growing in sheoak valleys from Lake Maurice to the east-west railway line and in " crab-holes " on the edge of the Nullarbor Plain as far south as Lake Tallacootra. The natives said that it grew as far east as Wynbring Rocks. It is abundant on Yalata.

Sugar was so scarce throughout the range of the South Australian natives, and receptacles for holding liquid were so imperfect, that alcoholic fermentation had not been discovered before the coming of the white man. It is possible that some native flowers rich in honey, as species of *Banksia* or *Grevillea*, might at times develop some alcoholic content, but quite insufficient to produce even merriment.

The Vegetation as a Source of Water

In my Clive Lord Memorial Lecture I have gone fully into the matter of the supply of water from the roots of mallee and of the needle-bush, *Hakea leucoptera*. Mr. H. A. Dadswell's investigations on my behalf showed the remarkable porosity of these roots, which indeed can be readily seen with the naked eye. A root a little less than an inch in diameter could supply a gallon of water if all could be expelled, but this would not be the case on account of capillary attraction. I was much impressed at Yalata recently when we asked a native to select a suitable tree for supplying water. He chose a luxuriant and spreading mallee, identified for us later by Mr. C. Boosma as *Eucalyptus oleosa*, growing at the edge of one of the open spaces so characteristic of the scrub of this part of the west coast. We cut out a few feet of one of the radiating surfoce roots, and on blowing at one end quite a torrent of tasteless drinking water was expelled. The mallees that I have seen from which a good supply of water can be obtained are *E. oleosa* and its variety *glauca* (*E. transcontinentalis*). Mr. J. M. Black, in his " Flora," states that the Kong Mallee (*E. gracilis*) is used as a source of water.

David Lindsay, in his " Journal of the Elder Exploring Expedition, 1891," records the following ingenious way of obtaining drinking water: " The day was November 5 and locality was after leaving Fraser Range Station, north of Esperance Bay. Lindsay ' noticed the native woman look about her, and then walk straight for a morell gumtree . . . The tree

trunk branched off into two about 4 ft. from the ground, and just in the fork was a small hole (decayed centre) out of which the small black ants were streaming in thousands. The woman pushed a stick in and withdrew it wet ', so here was a water supply . . . Turning to a shrub nearby a branch was broken, and with their teeth they loosened the bark and drew it off. Pushing the ends of three or four of these into one another, a long pipe was formed and the water sucked up. The water had collected there by means of the branches guiding the little streams of water after or during a shower of rain."

Dr. Jean Davies, in her account of the Musgrave Range natives during a visit from May 26 to June 22, 1942, recorded the following method of collecting water : " After our first night in the open (after leaving Ernabella), when we wakened to a frosty world, we saw the women swishing the grass with small wooden vessels and pouring the water so collected into their billy-cans."

Uses of Plants for Adhesive Purposes

For the hafting of native axes in their wooden handles, fixing stone ends on spear-throwers to form adzes and for other purposes, glue-like adhesive substances are required. Where certain species of porcupine grass (the " spinifex " of the explorers) grow, the natives have found an excellent material for their purpose in a sticky exudate that glues the bases of the leaves together. Dark-coloured cakes of this material can be readily softened by warmth near a fire, and moulded whilst pliant for the purpose desired, setting firmly when cool. The species used at MacDonald Downs in Central Australia has been identified as a variety of *Triodia pungens* R.Br. Miss Jess Chalmers thus describes how the natives of that region get the gum (" ungurra ") from the " spinifex " (" alichalta ") : " The native first selects the largest flat stone close to where the spinifex grows. (It only grows on the hilly country.) Then pulling up the plants by the roots they are piled about a foot high on the stone. Next the plants are well beaten with a stick and then thrown aside, leaving the gum and some broken blades and stalks mixed with it on the stone. The light grey gum can easily be seen clinging to the lower stalks and blades before the plants are beaten. With a piece of grass used as a brush the whole is heaped together and placed in a bark dish and the coarser stalks and blades sifted out while a flat stone and two round ones are heating in a fire. The mass is then placed again on the stone which has been swept ready. The two round stones ar now rolled over the mass until it resembles a crumbly damper. A stick is used to push the stone back and forwards. The native now picks up the damper and sprinkles the rock with fine soil to prevent the gum sticking. He next gets the flat stone and smooths the mass thoroughly on both sides. This stone is very hot and burns out the fine broken blades and turns the gum to a dark colour. After waiting till it cools he rolls it with his hands into a flat cake."

Species of porcupine-grass yielding a suitable gum are, however, absent from many parts of South Australia, so poorer substitutes have to be employed. On the Diamantina, mindrie gum was used. This was obtained as an encrustation on the roots of *Leschenaultia divaricata*, one of the Goodeniaceæ.

Horne and Aiston give the following account of the preparation of mindrie gum :

" Mindrie is a wiry, bush-like plant that grows in the swampy holes on the plains. To get the gum the blacks dig up the roots, scrape them down with a stone knife until they are all scraped away ; then they put the result (it looks like wet sawdust) in the hot ashes. Some-

times they hold the frayed-out roots over the fire. The gum then forms in small lumps, and these are carefully raked out of the ashes to be pressed up into a ball with a mixture of kangaroo dung."

In the Flinders Ranges the gum of the grass-tree (*Xanthorrhœa*) was used, and probably this was employed throughout the south. Peron, in 1802, refers thus to a gum, presumably derived from *Xanthorrhœa*: " Nor will I say much about the resin furnished by the tree which the English mis-name *gourmier* (Scott's footnote, ' Peron's word '), a resin which by reason of its hardness may become of very great value in the arts. It will be sufficient to say, General (i.e. General Decaen, Isle-de-France), that I possess a native axe obtained from the aboriginals of King George's Sound. It is nothing better than a chip of very hard granite, fastened to the end rf a piece of wood, which serves as a handle, by means of the resin to which I have referred . . . It will rapidly split a wooden plank and one can strike with all one's force, without in the least degree injuring the resin. Though the edge of the stone has several times been chipped, the resin always remained intact."

Beefwood (*Grevillea striata*) gum has also been used.

In 1946 the late Rev. J. R. B. Love sent me the twigs of *Acacia aneura*, probably the variety *latifolia* (the rather broad phyllodes are slightly curved) with the information that the natives obtain a gum (" kiti ") from the white powder encrusting the phyllodes. The tree is called " minjura," ordinary mulga " kurku." " The twigs are picked and taken to the nearest ant-bed (termitarium), never far to seek, for clear hard earth. There beaten with a stick. The powder falls off the leaves on to the bare ground. The leaves are picked off, the powder is collected and winnowed in the wooden dish. Then put on earth, melted with burning twigs and moulded with saliva—moistened (not " washed ") fingers to prevent the hot melted gum from sticking to the fingers." The gum is used as " spinifex " (*Triodia*) gum is.

N. B. Tindale records that the sticky fruits of *Boerhavia diffusa*, a prostrate plant, are used in the Musgrave-Mann Ranges as a tangle-foot for small birds.

Wood, Bark, Bushes and Fibres used for Weapons, Utensils, Break-winds, Baskets, Nets, Etc.

These can only be cursorily mentioned. The late Mr. J. M. Black gave the name *doratoxylon* to the *Tecoma* of Central Australia as the long thin flexible branches were treated and used for making spears. (Greek *doru, doratos*—the shaft of a spear; *xylon*—wood). Heavy yam sticks may be made of mulga (*Acacia aneura*). Coolamons and dishes may be gouged out of the soft wood of the Bean Tree (*Erythrina vespertilio*), or by prizing off the thick bark of a suitable bend in a stout branch of a Eucalypt. Bark canoes were used on the Murray and a tree from which such had been obtained is suitably marked on the roadside near Currency Creek. Bushes were used as break-winds and for wurleys. Firesticks were in constant use. On the Diamantina the stringy bark of the legume *Psoralea patens* was used as a fibre. At Blackford, near Kingston, the remnant of the local natives informed me that they used for plaiting and making baskets the sedges, *Lepidosperma canescens* (" pinkie "), *Cyperus gymnocaulus* and another species (" kukandu ") with red bases to the stems.

Vegetable Substances for Adornment

These have been mentioned in my Clive Lord Lecture. They comprise charcoal for blackening the face, the dark purplish-fuscous spores of the stalked puff-ball, *Podaxon pistillaris* (L.) Fr., applied as a powder-puff also to the face, the flowers of *Cassia* and other plants tucked into the forehead band, the red seeds of the Bean-tree (*Erythrina vespertilio*) as a necklace, and the capsules or buds of Eucalypts into which small girls may tuck the tips of slender locks of hair with a not unpleasing effect. The woolly-looking flowerheads of *Portulaca filifolia* may be stained with red ochre and attached by blood serum for ceremonial purposes. At Yuendumu in Central Australia the woolly perianth segments of *Gomphrena Brownii* (a plant said to indicate the presence of zinc) is similarly used. The velvety fluff on the stems of *Dicrastylis exsuccosa* (*D. ochrotricha*) is used near the Granites in Central Australia for decorating the body for ceremonies.

Plant Substances Used in Games and Play

The Koonibba and other west coast natives of South Australia had a game, " wit-wit," consisting of causing by a special technique a slender stick with a spindle-shaped end to travel at considerable speed through low undergrowth.

Native children in Central Australia make diminutive spears out of the stems of a tall grass (*Themeda avenacea*) and vied with each other in aiming at a moving disc of bark.

Little girls may use dried Eucalyptus leaves to represent natives lying down at a camping site.

Doubtless many other examples could be collected.

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J. B. Cleland.

Australia: Material Culture. **McCarthy.**

Distributional Notes on Northern Australian Point Industries. *By Frederick D. McCarthy, Dep. Anthr. (Syd.)*[1]*, Curator of Anthropology, Australian Museum.*

1. Gregory Salt Sea, W.A. (Plate H).

Father E. A. Worms, a missionary in the Kimberleys, recently sent to me a parcel of quartz and chalcedony implements that he collected in July, 1955, east of Gregory Salt Sea in the Great Sandy Desert of northern Western Australia. They are mostly knapped implements of the flake and blade type, as follows:

Blocks: Three very well worked discoidal blocks, or high-crowned scrapers, of approximately the same size, 3–4 cm. long, 2·5–2·8 cm. wide, and 2–2·3 cm. thick. They are oval in shape, and trimmed all around their peripheries. One bears heavy step-chipping typical of hafted adze flakes, and one has a rectangular-shaped nose beside a small concave working edge at one end. They are probably adze-flakes.

Knife: A narrow blade 4·8 cm. long with a scaled cutting edge along one margin.

Scrapers: These comprise one side, one double side (worked on reverse faces), one double side and one end, and one concave (2·5 cm. wide and 2 mm. deep) scrapers on blades from 3–5 cm. long and 2–3 cm. wide.

Thumbnail scraper: One 2·4 cm. long trimmed along one side and the distal end.

Tula adze flakes: There are two complete *tula* adze-flakes, the larger one 4×3·5 cm. in size, being lightly used, and the smaller one, 3·5×2·5 cm., worked to a steep face about one-third back from the original distal end. A third one is neatly trimmed along one side and end, the other side being split off to leave a burin-like spall.

Tula adze-slug: There are 18 typical slugs bearing a plain striking platform and portion of the inner face of the flake. The working face on each one is step chipped at a steep angle. They are from 3–5·5 cm. long.

Burins: The two burins in the collection form a new distributional record for this type in north-western Australia. One is a blade 6·4 cm. long, down one side of which a broad spall has been knapped, with a working edge 6 mm. wide at its distal end. The opposite margin is retouched, and a second spall has been struck at the top of it to form a conspicious projection at the distal end which bears the burin edge with a plain platform. The second example is a scaled burin with a working edge 3 mm. wide on a blade 4 cm. long. The opposite margin is also retouched on this blade.

Uniface points and blades:

Bi-marginal pirri: There are six points of this type, from 3·2–5 cm. long, 1·5–2·4 cm. wide, and up to 7 mm. thick. Four are trimmed right along both margins and another one at the point end only, and one is retouched along one margin only.

Paroo point: This is an excellent example of this broad point. It is 4 cm. long and 3 cm. wide, and well trimmed along both lateral margins.

[1] Published by permission of the Trustees of the Australian Museum.

Biface points: There is an interesting series of nine (four portions only) biface points, all crudely made, but ranging to a size in excess of those usually noted in this type. The largest one is $7 \times 3 \cdot 5 \times 2$ cm. in size, curved from butt to point, and very crudely fashioned. The other three, of the same type, are from 3·5–5 cm. long, 1·7–2·4 cm. wide, and 5–7 mm. thick. One has one dentated margin, one a plain striking platform on the butt, and three a trimmed convex butt.

There are, in addition, four point ends of larger examples, one of which, in chalcedony, the flake scars are irregularly disposed in a manner similar to that on the *pirri* and Kimberley points.

The finest point in the series is a microlithic one, $3 \times 1 \cdot 5$ cm., by 3 mm. thick, irregularly dentated on both margins, and with a plain butt.

Leilira blades: There are two point ends and one butt of blades which are probably of the *leilira* type.

Technique: All of these implements have plain butts, the range of angles being as follows: Unused flakes and scrapers: 100°–1; 103°–1; 110°–6; 115°–2; 120°1; 125°–1; 143°–1.

Tula adze-flakes: 110°–1; 114°1; 115°–1; 120°–2; 125°–1; 128°–3; 130°–5.

Uniface points: 108°–2; 110°–1; 120°–2.

The majority of the *tula* are thus in the higher range from 120 to 130, while the unused flakes and scrapers display a widely dispersed set of angles.

Affinities: This industry, like that at Tandandjal (McCarthy, *Oceania*, XXI, 1951, 205–13), consists of a mixture of elements from the Pirrian culture in the uniface points called *pirri*, from the Mudukian culture in the *tula* adze-flakes, and from the Kimberleyan culture on the biface and dentated points. The crude biface points are similar to many of those excavated at Oenpelli by McCarthy and Setzler in 1948 (described in a paper awaiting publication in the Records of the Australian and American Arnhem Land Expedition). This Gregory Salt Sea industry, however, includes the *tula*, which was not found at Oenpelli where its place was taken as the predominant specialized knapped working tool by the *elouera* (Setzler and McCarthy, *Journal, Washington Academy of Sciences*, Vol. 40, 1950, pp. 1–5). The occurrence of burins adds to the known wide distribution in Australia of this implement, as it has now been recorded from eastern New South Wales, south-eastern South Australia, and Tandandjal in the Northern Territory, while it occurs also at Oenpelli and throughout western New South Wales. Father Worms has informed me that the locality in which the implements herein described were collected is at present occupied by the Gogadja tribe, whose members do not make or use stone spear heads.

2. Burrundi, Northern Territory (Plate I).

Another interesting example of the variation of this northern industry is displayed in a small batch of implements presented to the Australian Museum by Mr. A. Fordon-Bellgrove, B.Sc., who collected them at Burrundi (on the McKinlay River), which is 115 miles south of Darwin, between the Adelaide and Mary Rivers. The site is in hilly country five miles north-east of Mt. Wells. The collection forms a sample from an extensive workshop

Plate H. *Gregory Salt Sea, Western Australia.*

Fig. 1. *End scraper.* 2. *Side scraper.* 3. *Knife.* 4. *Discoidal high-crowned scraper.* 5–6. *Tula adze-flakes.* 7. *Scaled burin.* 8. *Bi-marginal pirri point.* 9. *Dentated Kimberley point.* 10–11. *Tula adze slugs.* 12. *Biface point.* 13. *Burin.* 14. *Thumbnail scraper.* 15. *Uniface pirri point.* 16. *Uniface Paroo point.* 17. *Large and crude biface point.* 18. *Biface point.* 19. *Point end of leilira blade.*

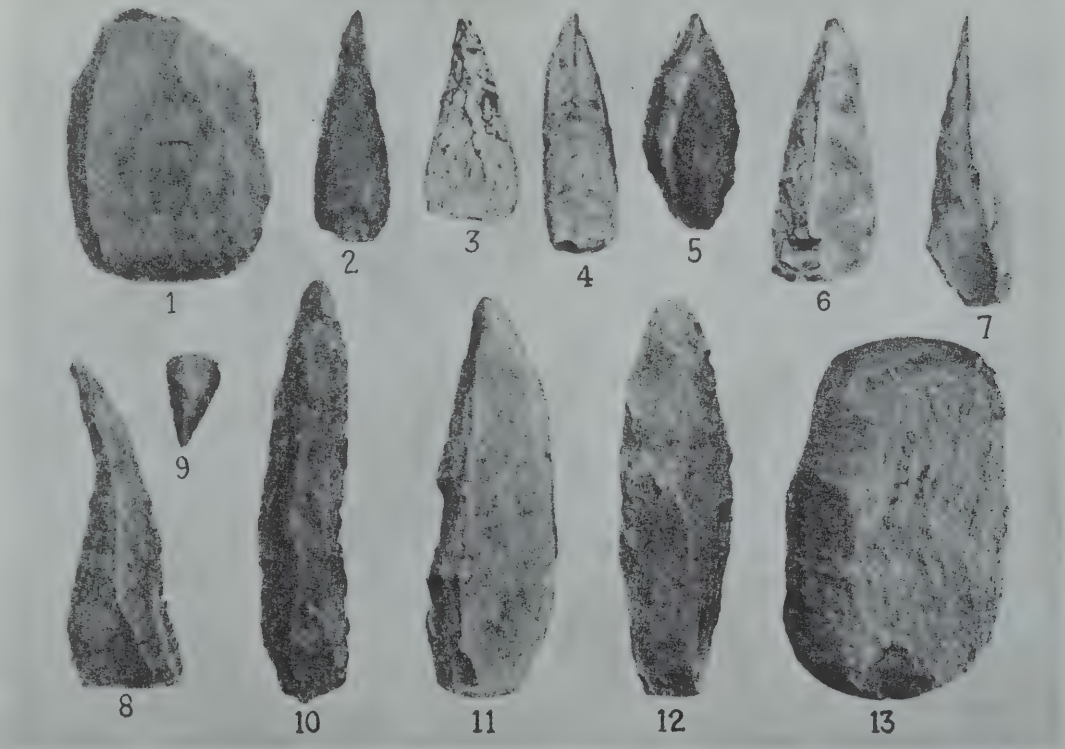

Plate I. *Burrundi, Northern Territory.*

Fig. 1. *End and side scraper.* 2–10. *Uniface pirri points.* 11. *Leilira blade.* 12. *Biface Wanji point.* 13. *Edge-ground axe.*

on a hill of a black siliceous, carbonaceous rock, like a chert, very hard and flinty. There is also an arrangement of stones in the vicinity. The implements are as follows :

Edge-ground axe : A biface-coroid axe 10·5×7×2·7 cm. in size, on which the blade has been battered to a blunt face by percussive use, and the butt has also been employed for this purpose.

Scraper : The only scraper in the series is a blade 8 cm. long × 6 cm. wide, trimmed along one lateral margin and the distal end on the outer face, and along the other margin on the inner face.

Uniface points : The most important group in the collection is a series of 15 complete uniface points and two pointed ends of these implements. One is a microlithic *pirri* 2·8 cm. long with a hump on its ridged outer face which is trimmed all over its surface. The others range from 6–11·3 cm. long, 2·3–3·3 cm. wide, and 3–7 mm. thick. Most of them are trimmed along both lateral margins, some along the edge only and others from the edge to a median ridge. Five display a steep-faced step-trimming on one or both margins. Two bear irregularly disposed flake scars in an all-over treatment of the outer face, and one of these is trimmed to a rounded butt typical of the *pirri* point, as are two of the other examples. Four have a plain unworked striking platform at the butt end, but five have a faceted platform with angles ranging from 93 to 110 degrees. They are mostly straight and symmetrical in shape but on several of them the trimmed margins follow the curve of the median ridge on the outer face. One is thick and step-trimmed on one margin, and it is also slightly trimmed on the inner face. One of the longer points has been roughly flaked along one margin of the inner face.

These points display the characteristics of both the *pirri* point and *leilira* blade but in the main appear to belong to the former type. Larger points of the same kind might also be found on the site.

Leilira blade : A pink quartzite example 11·5 cm. long, with a median ridge. It is trimmed partly on both margins, and has a plain butt with an angle of 124 degrees.

Biface Wanji point : There is one specimen of this rare point in the collection, and the site is the first one to be recorded for the manufacture of the type. It is 11·5×3·5 cm., and 5 mm. thick. The butt is trimmed to a straight thin edge. It bears the characteristic long flake scars on both sides, with smaller ones along both margins.

Remarks. These two collections, which of course do not represent a full selection of the implement types on either site, are of interest because of the problem involved in the classification of the uniface points. This difficulty was pointed out in connection with the Tandandjal points (McCarthy, op. cit., p. 208). It is obvious that in the Northern Territory and Kimberleys the *pirri* reach a larger size than in western New South Wales and South Australia. Furthermore, it also bears a close relationship to the *Leilira* blade, and the origin of both could well have been in the one point, which in response to different needs, developed on the one hand into the *leilira* blade, and on the other into the biface point.

The Gregory Salt Sea material consists of a mingling of the Mudukian and Kimberleyan cultures, and the Burrundi collection forms both an interesting distributional record of the *pirri* and an as equally interesting mingling of three kinds of points, the *pirri*, *leilira* and *wanji*.

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F. D. McCARTHY.

Australia: Maternal Culture. **Calley.**

Firemaking by Percussion on the East Coast of Australia. *By Malcolm Calley, B.A., Department of Anthropology, University of Sydney.*

While engaged on field work on the far North Coast of N.S.W. during 1954 and 1955, Bandjalang informants told me of an indigenous technique for making of fire, by striking two stones together.

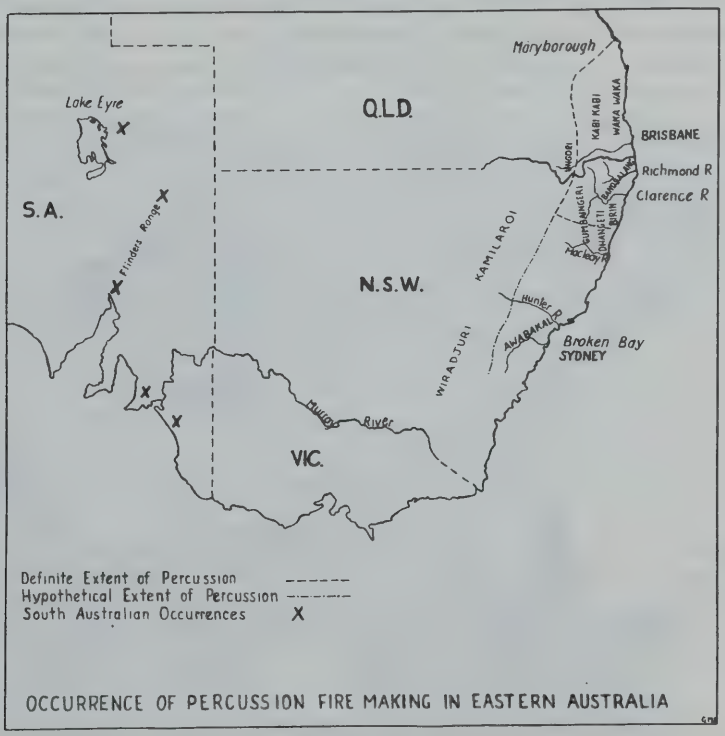
Detailed questioning of old people at Woodenbong, Tabulam and Cabbage Tree Island established that this technique was in common use among the Bandjalang before the arrival of Europeans. So complete was agreement among informants from all settlements within the tribal territory that I was forced to reject the hypothesis that percussion fire-making had been introduced by early European settlers and gold prospectors, though after contact, a file was often used in lieu of one stone. At Woodenbong, one old woman still used the technique quite often, and demonstrated it to me.

In the Bandjalang language, the process was (and is) called *dindabarng*. Of the two stones used, one was a flat, circular, white grey or yellow river pebble about six inches in diameter known as *jalgun*. This word has the primary meaning of " sun ". Informants agreed that the stones were called *jalgun* because of their association with fire as well as because of their shape and colour. The word *djugun* might also be used of this stone either as a fire-making implement or as the raw material for stone tomahawks, *wogara* and *ngamara*. This word was also used of the second stone. In all dialects, the common Bandjalang word for " stone " is *djaru*. As this district was once an important producer of gold, most older aborigines have been prospectors and are familiar with popular English and semi-scientific words for different kinds of rock. They agreed that " firestones " were " ironstone " or " pyrites ".

Before the coming of the white man, a fungus from the boles of rain-forest trees, dried and pulverized was used as tinder. Latterly, charred cloth was found to be more satisfactory. There was a special magic song sung to make the spark catch the tinder. Several old people had heard their parents and grand-parents sing it, but unfortunately none could remember the words. The technique remained in common use long after matches became available.

There was some disagreement on the universality of the technique. All were aware of the friction technique though none had employed it and many denied that it had ever been in use among the Bandjalang. Others believed that the two techniques existed side-by-side.

Those who believed percussion to be the only Bandjalang technique, spoke of the friction method as belonging to the Ungorri (South-Central-Queensland) and to the Kamilaroi (North-Central-Western New South Wales). It is vaguely held that Ngathungali (a prominent culture hero) taught the Bandjalang to make fire by percussion, but I could obtain no detailed legend of his doing so. Ngathungali is now considered to be identical with the Christian "God", and the origin of anything whatsoever is liable to be attributed to Him.



Other Occurrences on the East Coast.

On Cherburg Aboriginal Settlement near Murgon in Southern Queensland, an aged member of the Waka Waka tribe described the percussion technique to me. He insisted that the friction method was never used among the Waka Waka and Kabi Kabi (on the Queensland coast between Maryborough and Brisbane) but that it belonged to the Ungorri to the south-west. Other Waka Waka informants agreed with this. The Waka Waka technique was identical with the Bandjalang.

Informants of the Birin (on the coast south of the Evans River) and Gumbaingeri (inland from the Birin, south of the Clarence River) were also familiar with the technique, though agreeing that the friction method was also in use. A Dhangati informant at Cabbage Tree Island, an exceptionally intelligent and reliable initiated man stated that his tribe (on the coast between the Macleay River and the Birin) were familiar with the technique.

though other Dhangati informants at Kempsey either did not know of it or were unwilling to tell me about it. The latter alternative is quite likely as I was at Kempsey for only a week and it is generally much longer than this before informants will discuss what they now consider to be " secrets " of the old life or " gifts " made by God exclusively to the aborigines.

Threkeld[1] records the use of a word, *bannirra* meaning " to beat two stones together to make fire " among the Awabakal " tribe " (or more likely " clan ") of Lake Macquarie. It is, of course, much too late to corroborate this from contemporary informants and this is the only evidence of fire-making by percussion on the coast, south of Kempsey. It is, however, reasonable to suppose that the technique was known on the coast at least as far

Photograph showing an old Woodenbong woman making fire with a single stone and a file. Tinder is contained in the tobacco tin.

south of Sydney, and possibly beyond. We know that there was a striking degree of homogeneity all along the east coast of New South Wales in culture and (with exceptions) social organization.

The technique seems to have been restricted to the coast. There is no mention of it in the literature of the Kamilaroi and Wiradjuri groups of tribes. Among the predominantly Northern Kamilaroi mixed blood populations of modern Moree and Boggabilla, not a single informant had heard of the percussion technique, whereas all the older people were familiar

[1] Rev. Threkeld. " *An Australian Language as Spoken by The Awabakal, the People of Awaba, or Lake Macquarie.*" Charles Potter, Govt. Printer, Sydney, 1892, p. 72.

with fire-making by friction. This is surprising when it is considered how much coming and going there has been between the inland and coastal regions during the last fifty years.

On the east coast of Australia, then, the making of fire by percussion definitely occurred from Maryborough in Queensland to somewhat south of the Clarence River in New South Wales, extending inland roughly as far as the Great Dividing Range. With a lesser degree of certainty it extended as far south as Broken Bay, and it may be reasonably suggested that it was known even farther south, perhaps even to the Victorian border.

General Deductions.

Mountford and Berndt[2] suggest that in Australia the percussion technique was prior in time to the friction method. This claim is certainly borne out by the occurrence of the former on the east coast, where among the Bandjalang and the tribes south of Kempsey it is found in association with an Aluridja type of kinship system lacking sections. We can, perhaps, think of these peoples as a remnant of an earlier migration, pushed to the coast by a later influx of section-possessing tribes from the west. It is likely that sections had not long been established among the Waka Waka and Kabi Kabi of southern coastal Queensland, as in many respects their culture and social organization was very similar to that of the Bandjalang to the south. The same may be true of the Birin and Gumbaingeri. There may be a degree of correlation between the absence of sections and the making of fire by percussion.

The occurrence of the percussion technique in coastal South Australia among the Ngadjuri, Jaralde and Ramindjeri as recorded by Berndt and Mountford[3] certainly support this thesis, nor do the inland occurrences among the Dieri, Adnjamatana and Anta'kirinja necessarily invalidate it. As well as surviving around the coast, it would be reasonable to expect the technique to linger on in isolated, inhospitable regions such as Lake Eyre.

The relative efficiency of the two techniques would depend on the kind of stones available. Friction would be demonstrably superior in areas lacking in the more suitable types of stone. My Bandjalang informants, knowing of both techniques, considered percussion to be both quicker and less onerous. This may, perhaps, be treated as an expression of local patriotism, but the survival of the technique in this area down to the present day suggests that it is not necessarily so inefficient as Berndt and Mountford[4] were led to believe.

MALCOLM J. CALLEY.

REVIEWS :

Society in India. *Edited by Dr. A. Aiyappon and L. K. Bala Ratnam., Social Sciences Association, Madras,* 1956. *252 pp., 4 plates.* 30s.

The value of this volume of anthropological essays lies not so much in what it reveals of Indian culture as what it tells us about the state of anthropological research in that country. It is an account—a fairly comprehensive and detailed account—of the First All-India Conference of Anthropologists and Sociologists, held in Madras at the latter end of 1955. It was well organized by the Social Sciences Association, had the support of the Ford

[2] Mountford C., and Berndt R. "Making Fire by Percussion in Australia." *Oceania,* XI, No. 4, June, 1941, p. 342ff.
[3] Op. cit.
[4] Ibid.

and Rockefeller Foundations and was honoured by the presence of Robert Redfield of Chicago. The quality of the papers submitted was about equal to those submitted to Section F of the Australian and New Zealand Association for the Advancement of Science.

The principal impression gained from reading the papers printed in this volume and the discussion which followed the presentation of each paper, and which is also printed herein, was that the anthropologists and other educational, administrative and industrial leaders who attended this conference are extremely conscious of the many sociological and anthropological problems facing them and of the urgent need to train social scientists to investigate these problems and to come forward with solutions based on known and measureable data. One also cannot escape pointing out that the adoption of the attitude taken by the participants in the Conference to the science of Anthropology is a compliment to Western civilization. The kind of anthropology these Indian scholars are pursuing in India was learnt at the feet of English, French, German and American teachers, and the quality of the work now being done in India is likewise a compliment to the thoroughness of Western methods of teaching and the philosophic soundness of the disciplines taught in our Western Schools of Anthropology.

In a short review such as this, one can but mention those essays which impressed one as more than competent contributions to the subject. I was especially interested in Dr. Redfield's paper on " Primitive and Peasant : Simple and Compound Society ", and also in Mrs. Irawati Karve's paper on "The Cultural Process in India". It is always interesting to listen to an Indian trying to analyze the caste system. Four other papers of outstanding value were a study of " The Social Effects of Urbanization on Industrial Workers " by Dr. Prabhu ; a study of " Social Change in a Multi-Caste Village " by Mr. Shah ; a very good analysis of " The Changing position of Women in India " by Dr. Ehrenfels and a study of " Suicide in South India " by Dr. Aiyappon and Mr. Jayadev.

These few titles indicate the type of problem now exercising the minds of Indian students of the social sciences and to any reader interested in Indian attempts to solve such problems this well produced volume is recommended. The editors are to be congratulated. They have conveyed not only the facts relating to the subjects raised at the Conference but the vitality and enthusiasm of all who contributed to its success.

F. L. S. Bell.

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